The Influence of the Washington Consensus Programme on the Transitional Economies of Eastern Europe – a firm level micro economic analysis

Robert Peter Howard-Jones

A Thesis Submitted in Partial Fulfilment of the Requirements of Bournemouth University for the Degree of

Doctor of Philosophy

May 2019

Department of Accounting, Finance and Economics

The Faculty of Management, Bournemouth University

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Acknowledgements

I would like to express my appreciation to my supervisors Professor Tim Lloyd and Dr Khurshid Djalilov for their support, invaluable advice and encouragement. Other academics have also provided support and assistance, in particular my fellow authors Professor Jens Hölscher, Dr Dragana Radicic and Dr Hossein Hassani, who guided me to the achievement of three published papers. I owe a debt of gratitude to Professor Allan Webster who was instrumental in persuading me to attempt what I thought was an impossible task and for providing continued support throughout the process. I am also grateful to my fellow Ph.D. students who have provided a tremendous platform of mutual support, welcoming into their midst, with a generosity of spirit, someone old enough to be their grandfather, allowing me to forget the gulf between youth and age. Finally, my beloved wife who has shown an unfailing commitment to a journey that has stretched both of us when our peer group has been enjoying retirement and, not least, for proof reading my initial attempt and then the revised version of this thesis to ensure that it is both easily read and grammatically correct.

Abstract

This research explores the effectiveness of the Washington Consensus (WC) programme as a mechanism for improving national welfare in transition and emerging economies. The programme, so named, by Williamson (1989) who coined the phrase to explain the influence of the International Finance Institutions (IFI) on the development of the world economic order. The view emanating from the WC is that there is a universal panacea, which improves national welfare wherever it is implemented. Research to date has tended to focus on specific regions of the world and, as a result, any analysis of the WC is limited by the distortions of different economic paradigms, cultures, religions and political ideologies. This thesis argues that, in Eastern Europe, a region exists which, coming from the same economic, political and ideological paradigms, has now split into three identifiable groups (the new member states of the European Union; the Balkans; the Commonwealth of Independent States). These countries are at different levels of transition but have adopted all or some elements of the WC programme. The internalisation of the WC paradigm by the European Union (EU) provides further justification for using these countries as an appropriate vehicle for analysis. The existence of this group transcends the normal restrictions of cultural, political and ideological beliefs and serves as a natural experiment when comparing member and non-member states. One of the key elements of economic growth is firm performance and the research uses survey data from The Business Environment and Enterprise Performance Survey, together with further descriptive statistics from the World Bank and Transparency International, to evaluate productivity and profitability of firms in transition states. Firms within and outside the European Union are compared using matching models, with key conditional variables based on the paradigms of the WC programme. The analysis is conducted on the full sample and disaggregated into the manufacturing and service sectors. The results indicate that there is a positive benefit to firms with accession to the EU, leading to productivity and profitability improvements and performance advantages over those in non-member states. Foreign direct investment directly benefitted those which became investee firms, with little evidence of spillovers to domestic companies. The vertical nature of the investment with an emphasis on international production networks which utilise significant levels of foreign inputs, infers protection of intellectual property and a reduction in value added, with results indicating a failure to achieve an export multiplier. There is evidence of substantial benefits accruing to firms in receipt of loans, but the apparent paucity of their availability may imply market failure. The gains made by innovative firms do not appear to do justice to the initiatives undertaken and may indicate a dilution of national innovative capacity. The independent study of the Balkan region reveals most of the benefits accruing to the service sector concentrating on domestically based development and a lack of focus on exporting. In terms of policy implications, the attraction of FDI led states into a competitive environment which in turn resulted in corporate state capture, gearing taxation and infrastructure to the demands of the foreign investors. The asymmetric development of infrastructure and institutions has had a detrimental effect on national welfare, which, allied to the need for improved financial intermediation, reveal key policy implications for any future European enlargement.

Table of Contents

List of Tables

List of Figures

Chapter 1 Introduction

"In whose particular interests is it that the State take a neoliberal stance and in what ways have those interests used neoliberalism to benefit themselves rather than, as is claimed, everyone, everywhere?"

David Harvey (2007)

1.1 Background

The onset of globalisation and the emergence of economies in transition have brought into sharp focus the most appropriate paradigm to develop national welfare in both developed and developing economies. The influence of the International Monetary Fund (IMF), the World Bank and the G7 countries, led by The United States of America, has been important in setting the agenda. In the 1980s and 90s the neoliberal paradigm favoured as a template for economic success, was epitomised by the use of the term "Washington Consensus" (WC). The description was coined by Williamson (1989) and, despite claiming that his paper has been misinterpreted by both supporters and detractors, it remains a useful means of explaining the influence of the International Finance Institutions (IFI) on the development of the world economic order (Rodrik 2007, Williamson 2009, Babb 2013).

The world is becoming a more unequal place with the alleviation of poverty moving at a slow pace, bringing into question the benefits of globalisation. The issues of inequality, poverty and the continuing belief in the paradigm of the Washington Consensus, are not questions confined to emerging markets, but resonate equally throughout the Western world (Held 2005). Within this belief lies the conflict of applying an international consensus to national problems, without consideration of politics, culture, religion, economic status or regional imperatives (Gore 2000). To this essentially economic and financial model, was added the belief that Western democratic norms were an essential subset for successful implementation of reform (Dreher 2006).

The view emanating from the WC is that there is a universal panacea, which improves national welfare wherever it is implemented. Applicable to both developed and developing countries, it has been the source of controversy, with several critics claiming that it is primarily a device to protect creditors from default (Stiglitz 2005).

There is a body of literature which uses the descriptor "post Washington Consensus", however it is recognised that any change in the basic tenets or implementation of the programme is more of an augmentation or an evolutionary process rather than a paradigm shift. In reality, by the very nature of the IFI's constitutions, the product is for export only with a packaged policy of one size fits all and predicated on conditionality; the provision of money in return for policy reforms (Rodrik 2007, Babb 2013).

The WC debate is grounded in economics. The casual observer can be forgiven for believing that there is an unbroken neoliberal line between Adam Smith (1776) and the Wealth of Nations, through David Ricardo, John Mill, Friedrich Hayek and Milton Friedman. However, it is important to distinguish between Hayek and Friedman and the former supporters of classical liberalism. Classical liberalism, developed in the 19th century, promoted free trade and economic freedom, and also advocated civil liberties under the rule of law. It was essentially a political ideology, which argued that the nature of man as egocentric, required the state to control individual rights and provide services which could not be provided by the market. The main difference between classical liberalism and neoliberalism is the change of emphasis from the political to the economic and, from a Keynesian point of view, from demand side to supply side, with the added factor of the financialisaton and monetisation of economic activity (Plehwe 2009).

A body of scholarship has defined neoliberalism as the deliberate action of a "thought collective" born out of the formation of the Mont Pelerin Society (MPS) in 1947, whose founding members included Friedrich Hayek, Milton Friedman, James Buchanan and Karl Popper. Much of this qualitative research is focussed primarily on the sociological, theoretical and philosophical concepts enshrined in the ideology. Based primarily in the Chicago School of Economics, the London School of Economics, The Heritage Foundation in the United States and the Institute of Economic Affairs in London, their influence was to permeate through a transnational body of academics and think tanks.

There is strong circumstantial evidence of their influence on the economic developments of the early 1980s, when the administrations of President Reagan and Prime Minister Thatcher pursued policies espoused by the group.

They both formed advisory bodies consisting of MPS members; Friedman in the United States and Walters in the United Kingdom. Their influence on the Reagan administration permeated the International Monetary Fund with its emphasis on fiscal stabilisation, and the World Bank with its espousal of market deregulation and supply side policies (Mirowski and Plehwe 2009). Financial support from either became conditional on the adoption of the neoliberal policies that were their strategic core. The recognition of the influence of the neoliberal collective came in 1989 when John Williamson formally proposed a description of the policies espoused and called it the "Washington Consensus" (Pieper and Taylor 1998).

There is evidence that the application of the ideology of the WC programme has been prevalent in Latin America, South East Asia, Southern and Eastern Europe and Ireland and there are a number of critical commentaries relating to its application. These range from the Asian financial crisis of 1997 through to the contrasting experience of Latin America, where the benefits of reform were outweighed by lack-lustre growth, allied to an increase in inequality and poverty. Additionally, the transitional economies of countries liberated by the collapse of the Soviet Bloc received the perceived wisdom of a number of economists that the rapid implementation of the WC programme was the answer to the conversion to a Western style economy (Krugman 1996, Wade & Veneroso 1998, Gabrisch & Hölscher 2006, Franko 2007, Helleiner & Pagliari 2009, Grugel & Riggirozzi 2012 Hamm, King & Stuckler 2012). The literature tends to focus on specific regions of the world and, as a result, any analysis of the WC is limited by the distortions of different economic paradigms, cultures, religions and political ideologies. If it were possible to identify a regional bloc where the distortions were minimised, an opportunity would exist to analyse the WC programme, relatively free of these differences.

This thesis argues that such a region exists in Eastern Europe where, coming from the same economic, political and ideological paradigm, the region has now split into three identifiable groups:

- The New Member States (NMS) of the European Union

Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia (accession date 2004). Bulgaria, Romania (accession date 2007). Croatia (accession date 2013).

- The Central and Eastern European States

  Albania, Bosnia Herzegovina, Montenegro, Serbia, Kosovo, Macedonia (Pre EU accession protocol).

- The Commonwealth of Independent States

  Armenia, Azerbaijan, Belarus, Georgia*, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan**, Ukraine**, Uzbekistan (*withdrew 2008 ** not ratified).

These countries are at different levels of transition but have adopted all or some elements of the WC programme (Gabrisch & Hölscher 2006, Hölscher 2009). The internalisation of the WC paradigm by the EU, its application throughout the customs union and the conditionality of the adoption of the *Acquis Communautaire*, the accumulated legislation, legal acts, and court decisions which constitute the body of European Union law, by the NMS, in return for membership, provides further justification for using these countries as an appropriate vehicle for analysis. This transcends the normal restrictions of cultural, political and ideological beliefs and serves as a natural experiment in comparing member and non-member firms (Lutz and Kranke 2014, Fitoussi and Saraceno 2013).

The WC programme is weighted towards conditionality lending. This consists of the insistence by the IFI of the adoption of a reform programme based on the WC. Key elements of reform include trade liberalisation, foreign direct investment (FDI), loan finance, privatisation and institutional development. There is a significant body of literature, primarily at the macroeconomic level, which has analysed the impact of the WC programme both generally and specifically, but little exists at firm level and these micro economic analyses concentrate on individual countries and study specific variables, which contribute to tenets of international trade. This reform programme is designed to improve national welfare with the assumption that benefits accruing to capital are being distributed throughout the economy. Measurement of income

distribution and inequality can determine the extent to which an improvement in firm performance has trickled down the labour supply chain.

Improvements in these areas could be regarded as reasonable proxies for any improvement in national welfare and literature on this subject is extensive, employing a multiplicity of quantitative and qualitative techniques. Much of it analyses the American scene and broadly concludes that incomes have been eroded and inequality has increased, with international trade and technological change identified as the main determinants (Acemoglu 2003, Arbache et al 2004, Goldberg & Pavcnik 2007, Krugman 2008, Autor et al 2008). This would imply that the advantage lies with firms and not necessarily the population at large and there is a body of opinion that suggests that the WC is for export only, with the effect of the programme designed to benefit multinationals (Moosa 2019).

Of greater interest to this thesis is research centred on Eastern Europe. Literature in this area concludes that an increase in inequality is the result of temporary and self - employed labour, where skill deficits attract lower wages, allied to the effects of international trade, particularly when the latter is not accompanied by financial market development (Hölscher 2006, Hölscher 2009, Hölscher et al 2011, Aristei & Perugini 2012). It is widely accepted that the WC programme is intended to influence both the development of institutions and greater access to finance, whether capital or loans (Williamson 2009). It would therefore complete the picture if the influence of these part-micro, part-macroeconomic factors could be analysed to determine their influence on firm level performance. The World Bank, in particular, has evaluated these dimensions with the use of World Development and World Governance Indices. It has also cooperated with the European Bank of Reconstruction and Development (EBRD) to produce the Business Environment and Enterprise Performance Surveys (BEEPS) with the objective of obtaining feedback from firms to provide robust business environment indicators that are comparable across countries and companies.

These surveys provide sufficient information to evaluate the influence of each element of the WC programme on firm performance and, the progress of institutional and financial reforms (Escribano & Guasch 2005 and 2008, Iarrossi et al 2006). This research aims to evaluate the efficacy of the Washington Consensus programme on national welfare by analysing firm level performance, using the World Bank Indices

and the BEEPS data, to provide a microeconomic perspective on the key elements of the programme.

There is little evidence in literature that a comprehensive microeconomic analysis of the impact of the Washington Consensus programme has been undertaken when there are treated (EU members) and untreated (CEE and FSU states) groups to compare and contrast. The use of matching models using key conditional variables will provide a meaningful contribution to inform the debate about the efficacy of the approach in relation to firm productivity, the cornerstone of economic development ((Krugman 1994). The accession of 11 transitional economies of Eastern Europe into the European Union provides a platform to use these countries as proxies for the programme against a control group of countries that are not members. The differing rates of transitional progress of the three economic regions of the NMS, the CEES and the FSU, allow both a comparison of progress and an analysis of the influence of those elements of the WC programme adopted in each region. This will provide a critical insight into the influence of both the complete and partial application of the programme on economies in different stages of transition, from a micro economic perspective, whilst simultaneously ensuring that macroeconomic factors are not ignored.

Significant economic literature exists on the Washington Consensus programme and the effects of its separate elements on individual countries and global regions. However, little identifies its influence on firm level performance and institutional and financial development. This thesis will provide that insight across both micro and macroeconomic elements using data sets from the same sources across two time periods.

It will be of interest since it will use two treatment models Inverse Probability Regression Adjustment (IPWRA) and Quantile Treatment Effects (QTE), to provide a unified picture of the effect of the programme on three regions with the same recent economic history, which are now at different levels of transition. There is little evidence that such comprehensive work has been attempted to date.

1.2 Research Question and Philosophy

The prevalence of neoliberalism and its almost universal acceptance, even in academic circles, as the overriding paradigm for the conduct of economic affairs, brings into

focus its efficacy in the face of increasing inequality, the rise of populism and the changing nature of the geopolitical landscape in the 21st century.

The IFIs have dominated the economic development of the emerging and transitional countries, with a prescription that enshrined the WC programme as the basis for the conditional imperative of a tacit acceptance of neoliberal ideology in return for financial assistance. There is significant literature documenting the successes and failures of the WC programme, which is reviewed in the next chapter. However, it primarily covers individual countries or regions or is based on philosophical or socio-political principles. Nowhere is there a definitive examination of the application of the programme against a control group, since all the studies have the limitations of the national, cultural, ethnic and religious dimensions of the nations studied. The disintegration of the Soviet Empire has provided such a laboratory. The internalisation of the WC programme by the EU and the conditionality imposed on the new member states (NMS), whose accession was dependent on adherence to the programme, provides a viable platform to study the consensus programme as applied in totality (Fitoussi and Saraceno 2013). The results can be compared to other countries within the transitional economic group that did not become members but shared the economic, political, and to some degree cultural paradigm, which united them under the Soviet hegemon. The majority of non-EU member states adopted some elements of the WC programme, particularly privatisation and the liberalisation of markets, which also allows some analysis of whether the adoption of the whole programme is a prerequisite for economic success and the furtherance of national welfare.

The WC programme is essentially a prescription for economic and structural reforms. Its effect is dependent on privatisation, free trade, price stability, free flow of funds and the creation of institutional support for the free market paradigm. Hence, outside the role of government and its role in the creation of relevant and effective institutions, the effect of the programme will initially be felt by firms. Therefore, the behaviour and performance of firms is critical to the success or failure of the project. A number of studies, within transitional economics, have covered the effect of specific elements of the WC programme both on the region and on individual countries; specifically, in relation to exporting, foreign direct investment (FDI) and institutional development. However, there is no evidence of any holistic examination of the effect of the

programme on firms, which includes privatisation, firm characteristics, FDI, exporting, access to finance, innovation and the influence of institutional development.

To analyse the effects of the key elements of the WC programme on firm performance, the criteria of measurement must first be established. In this study and with reference to literature, productivity and profitability have been selected and measured utilising statistical information that conforms to the key tenets of the WC programme. This entails the use of empirical modelling to provide a series of results, which can be interpreted to provide a discussion and conclusion in relation to the efficacy of the WC programme with specific references to its key constituents.

The key research question is whether firms in the new member states of the EU are more productive and profitable than firms in the other Eastern European transitional economies. Ancillary questions relate to the key determinants of any performance advantage, namely firm characteristics (age and size), ownership (FDI), propensity to export, access to finance and institutional development.

It is recognised that it is important to establish the basis of one's research philosophy in the sense that one recognises the essence of the project undertaken and the philosophical imperative that underpins the research. Having a philosophical research platform assists the researcher in justifying the assumptions made for a particular research study (Flick, 2011).

This thesis is based on theory, allied to the examination of secondary empirical data, to draw falsifiable conclusions. Therefore, the ontology is based on reality; the use of external data which has to be logically ordered to be usable. The epistemology is based on facts, numbers and observations and, in consequence, the axiology has to be objective and value free (Saunders et al 2012). The philosophical identities of the research are founded in positivism and critical realism and resonate with the statement "in so far as a scientific statement speaks about reality, it must be falsifiable; and in so far as it is not falsifiable, it does not speak about reality" (Karl Popper 2005).

1.3 Relevant Economic Theories

The concept of international trade, foreign ownership, privatisation and a smaller State are key drivers of the WC. A number of trade theories underpin this approach and it is appropriate to trace their development from the early mercantilist era in the mid-

16th century, which advocated the maximisation of exports through subsidies and the minimising of imports through tariffs. Adam Smith (1776) effectively destroyed mercantilism and its colonial base. He advocated international trade based on the theory of absolute advantage in which countries concentrate production on goods where a greater volume can be produced than competitors for the same inputs, whilst simultaneously advocating allowing the market to determine the volume of trade between nations; the so called "invisible hand". Whilst Adams Smith's book The Wealth of Nations (1776) still resonates today, arguably the father of modern trade economic theory was David Ricardo, who developed the theory of comparative advantage in the Principles of Political Economy (1817). Here he hypothesised countries engaged in international trade, despite labour in one country being more efficient at producing all the goods than workers in other countries. Using two goods, he demonstrated that both countries could increase production and consumption if they concentrated on producing the good in which a comparative advantage existed (i.e. cheaper labour), exporting the first and importing the other. Ricardo's theory implies that comparative rather than absolute advantage is responsible for much of international trade.

The Heckscher-Ohlin (HO) trade model, introduced in the 1920's, develops the theory of comparative advantage using two factors of production, namely, labour and capital. The theory, and its generic term, factor proportions model, maintains that a country maximises its comparative advantage by exploiting the ratio (proportion) in which it has the most abundant factor.

It expands the Ricardian model by introducing a further factor of production and, in introducing two goods, factors and countries develop a simple general equilibrium model that allows the interaction of factors, goods and national markets simultaneously. This basic model has spawned a number of derivatives, namely, the Stolper Samuelson factor price equalisation and Rybczynski theorems. The Stolper Samuelson theory states that if the price of a good rises, then the price of the abundant factor of production will also rise, whilst the other falls.

In the context of international trade, the implication of this is that the onset of free trade will increase the return of the abundant factor and decrease that of the scarce factor. The factor price equalisation theory states that when trade liberalisation occurs,

prices of goods in each location are equalised between countries, and this is followed by the equalisation of factors of production. This implies that trade liberalisation should cause factor prices to move simultaneously, if trade between countries is based on differences in factor endowments. This research explores the relevance of comparative advantage in relation to foreign direct investment into the new member states of the EU.

The Rybczynski Theorem states that any increase in a country's factor endowment will cause an increase in output of the good that utilises that factor abundantly but will cause a decrease in the output of the other good. For example, an improvement in national education could, in turn, increase productive skill, including the more efficient use of capital. The theorem is relevant in the exploration of infrastructure expenditure and absorptive capacity following the accession of the new member states.

These models suggest that when trade liberalisation occurs, countries will experience an increase in aggregate efficiency. Prices will increase in export goods and reduce in goods subject to import pressure, eventually reaching equilibrium.

Countries will exploit their comparative advantage and will produce more of their export goods to maximise revenue but continue to produce, at a reduced level, those subject to imported competition to enjoy the marginal benefit. As a result of price changes, there will also be an improvement in consumption efficiency. This overall improvement in efficiency will improve national welfare (Sloman & Wride 2009).

There are also growth models that should be reviewed in the context of international trade. The Harrod-Domar model was developed independently by Sir Roy Harrod (1939) and Evsey Domar (1946), and states that the rate of economic growth is dependent on the level of saving and the capital output ratio. A high level of saving provides funds for firms to borrow and invest. Investment increases capital stock, which generates economic growth through increasing production of goods and services. The capital output ratio measures the productivity of the investment: the lower the ratio, the more productive the economy. The model suggests that developing economies should encourage saving and invest in technology to decrease the economy's capital output ratio.

By contrast, the Solow-Swan model (1956) is an exogenous growth theory set within the framework of neoclassical economics. It explains that there are three factors of production which drive economic growth, namely, technology, capital accumulation and labour. It hypothesises that a rise in capital accumulation and labour will increase the economic growth rate but will be subject to the law of diminishing returns. Thus, the economy will grow at a steady rate, with GDP growing at the same rate as the increase in labour and productivity. Once this steady-state is achieved and resources exhausted, growth can only be increased through innovation and technological improvements.

To some degree, the endogenous growth model is an extension of the Harrod-Domar model as it focuses on endogenous as opposed to exogenous factors. Endogenous growth theory hypothesises that investment in human capital, innovation, and knowledge are significant contributors, with the effects of a knowledge-based economy leading to growth.

It is also helpful to observe the debate about the relevance of trade theory through the prism of new trade theory (NTT), based on the principles of imperfect competition, which suggests that critical factors influencing international trade are economies of scale, network effects and first mover advantage that can be present in key industries. The theory develops a contrasting view to other formal treatments of trade which treated economies of scale as exogenous, allowing the assumption that markets were perfectly competitive (Krugman 1979). New trade theory assumes scale to be endogenous thus allowing the assumption of monopolistic competition and imperfect competition with profit at an appropriate margin characterising a market solution (Dixit and Stiglitz 1977). These factors may be more important than comparative advantage and, if this is the case, developed countries have a clear advantage over the emerging economies.

Research in the 1990s set great store by the technological advances that had taken place, the effect on demand for skilled against unskilled workers and the educated rather than the uneducated. The effect of trade on wage rates was largely dismissed as too small to be material; a view that was subsequently challenged by Krugman in his seminal paper in 2008. Here he propagates the view that trade between developing counties has increased since the 90s and now has a significant influence on wages. His

argument is based on actual data, measured against a "but for" scenario, using specific factors modelling, and hypothesising on the vertical nature of developing world manufacturing, in which a significant percentage of the skilled element of the finished product is imported from the developed world. He concludes that the increasingly sophisticated imports from emerging markets is illusory, and countries such as China continue to rely on skill based developed world imports to allow the comparative advantage of unskilled labour as an essential part of the product's factor content. That creates the Stolper Samuelson effect in the developed world, where the cost of skilled labour increases but the effect of the unskilled factor of production, based in China, reduces unskilled wages and increases inequality (Krugman 2008). However, in the same paper, Katz is critical of Krugman's conclusions, although his criticism concentrates more on data sourcing and the brevity of the educational and job-based variables used as explanatory factors, rather than his actual hypothesis (Katz in Krugman 2008). Equally, Lawrence has a fundamental issue with Krugman's modelling and his failure to include other variables in his research, particularly technology (Lawrence in Krugman 2008).

The evolution of trade and growth theories provide a platform from which to analyse the complexities of globalised trade within an environment in which the principles of free trade have become regarded as a stylised fact. Standardised trade theories make certain assumptions such as a closed economy and perfect competition, which ignore the reality of the environment in which firms operate. The new trade theory attempts to reconcile some of these realities claiming that economies of scale and technology spillovers resulting from international trade, improves national welfare. This may be particularly relevant to developing countries, since domestic industry can benefit from a number of aspects of international trade and justify state intervention in the form of strategic trade policies. The opportunity for knowledge and technological spillovers, allied to competition from foreign imports forcing productivity and quality improvements, can lead to growth and therefore the advantages of economies of scale (Helleiner 1992).

However, there are potential problems associated with opening up economies to international trade. Firstly, and particularly in Eastern Europe, the FDI attracted is the result of multinational companies incorporating domestic firms into international

production networks, taking advantage of the comparative advantage of cheap labour. Thus, the potential for spillovers is minimised together with the opportunities of export multipliers offered by EU enlargement. Secondly, the ability of firms to take advantage of any spillovers depends on the absorptive capacity available, with any rate of productivity improvement depending on an acceleration of educational and training initiatives (Keller 1996; Kneller 2005) and the asymmetric infrastructure expenditure, aimed at satisfying the needs of foreign multinational companies which threaten the development of a skilled human capital resource. However, the multiplicity of reforms undertaken in the transition from a command to a market economy, provides a rich environment in which to explore the relevance of the staple theoretical constructs.

1.4 Empirical Methodology – Two Approaches

The thesis adopts two empirical approaches, namely, inverse probability regression adjustment and quantile treatment effects. Two separate models are utilised as they provide a robustness check on the results and are designed to perform two different functions. Both are treatment models, in that they explore the performance of firms within the NMS of the EU against those that are comparable, having the same economic, political and social backgrounds and being at the transitional stage to a market economy. However, the IPWRA model is a matching model and is used to directly compare the performance of treated against non-treated firms. It has the added advantage of being able to adopt a multi valued approach, where additional treatments (other conditional variables) can be added to the base treatment of EU membership.

This allows two conclusions to be drawn; firstly, the absolute result of the performance of firms within the EU against those outside, and, secondly, when a conditional variable is added, the effect when observed on the performance of all firms regardless of their treated or untreated status. The model uses two regressions; a logistic model to predict treatment status and linear regression to predict outcomes. This has the advantage of being doubly robust, allowing for one of these models to be incorrectly specified but still producing a valid result. While the IPWRA model is centred on the outcome mean, the QTE model analyses the effect of EU membership and a vector of conditional variables on the entire dependent variable distribution. Based on the median outcome not the mean, and therefore less prone to outliers, it ameliorates the effect of firm heterogeneity and provides a much richer vein of information than that

furnished simply by the mean. The QTE model allows the measurement of performance across the entire distribution, with the added advantage that the use of median as opposed to mean, reduces the susceptibility to outliers. It is a conditional model controlling for firm and market characteristics, with EU membership (the treatment effect), regarded as exogenous.

1.5 Thesis Structure

This thesis consists of seven chapters. The first is the introduction, which gives an overview of the research and presents the background, motivation, the main research question and the theoretical dimensions, which provide reference points for the discussions and conclusions. The WC programme is predicated on the establishment of a free market, including free flow of funds, the development of sound public sector institutions and monetary and fiscal reform to support the new paradigm. This thesis examines the veracity of the claims made by supporters of the WC through the prism of firm level performance, measured as productivity and profitability, of firms in the new member states against a control group in the Commonwealth of Independent States and South Eastern Europe. Specifically, it pursues five major themes namely, the effect of EU membership; the influence of ownership; the advantages of exporting; the efficacy of loans and the impact of innovation. Additionally, it reviews the importance of firm characteristics (age and size) albeit, recognising that they are essentially control variables.

The choice of themes is predicated in literature, the majority of which has evaluated these as single issue items, and tests both the theory and empirical evidence in a holistic approach, which draws them together to enable a commentary on the WC programme as a whole. The thesis adds a further dimension, gleaned from a wide ranging review of the political economic literature, to allow a partial fusion of the influence of the political responses of states to the effects of the accession process.

The second chapter is the literature review. This consists of an analysis of the WC programme, its background and global application, together with a review of the criticisms it attracts. The claim that the WC programme is internalised by the EU is examined with reference to the evidence provided in literature, with examples justifying that assertion. This is followed by a review of literature on the Eastern

European and Central Asia countries in transition, with particular emphasis on privatisation and the role of both the EU and the WC programme in the process. There is a brief departure from economics into sociological and political literature to contextualise and provide a historical perspective on neoliberalism, which in this study, is proxied by the WC. The reform of institutions is examined, specifically the application of the principles of the WC programme and the influence of some of its key provisions, namely, privatisation and FDI, and whether the latter had the potential to have a detrimental effect on national welfare. Productivity and profitability are discussed as appropriate measures of firm performance, together with the relevance of the key independent and control variables, including their relationship to the research study.

A specific review is undertaken for international production networks and the Western Balkans, since the former provides one of the keys to understanding FDI within the NMS, and the latter is a group of states that are in a pre-accession protocol, and therefore, intuitively, should have characteristics that may indicate a greater degree of convergence between member and non-member states. The research gaps are identified, and the conclusion leads to a series of hypotheses.

Chapter 3 describes the data and the motivation for its use, and includes descriptive statistics on the transitional countries, with an overview of their regional context and geographical location. Since the data is primarily based on BEEPS, the use of surveys as a valid source of secondary data is discussed, including an evaluation of any limitations which may impact the research.

The variables used in each chapter are described, with a justification for their use, and key aspects of both the 2005 and 2013 questionnaires are highlighted. The methodology and econometric models used are covered in the individual empirical chapters.

Chapter 4 introduces the IPWRA model. Firstly, this only measures productivity as the dependent variable: the rationale being that one measure of firm performance is sufficient to make a direct comparison between absolute and relative results. Furthermore, the quality of BEEPS data, in relation to labour productivity, is entirely reliable and utilised in a number of published papers (Cieślik et al. 2014; De Rosa et

al. 2015; Ramadani et al. 2017). Based on observational data, (conditional variables), it estimates the causal effect of a treatment on a specific outcome, and thus makes a direct comparison of that effect on both the treated and untreated potential outcomes. This research seeks the potential outcome means for productivity of firms within the EU and outside, to allow comparisons to be made, and to draw a conclusion as to whether firms within the EU are the more productive. It adopts a multi valued approach, described in detail in Chapter 4, focussing on the major themes of the thesis with an emphasis on EU membership as the key treatment variable. This involves the addition to the main treatment variable of foreign ownership, exports, loans and innovation.

Using loans as the example, the following comparisons can be made for firm level productivity performance:

EU membership v. Non-EU Membership

Non-EU membership + Loans v. Non-EU membership

EU membership + Loans v. Non-EU membership

EU membership v. Non-EU membership + Loans

EU membership + Loans v. Non-EU Membership + Loans

EU membership + Loans v. EU membership

This facilitates a comprehensive analysis of the merits, within each economic bloc, of the treatment effects between EU and Non-EU firms and also between treated and untreated firms. The analysis covers the results for both 2005 and 2013 and disaggregates them into the manufacturing and service sectors. The opportunity is then available to compare and contrast firm performance one year after accession, for the majority of NMS, with that observed 9 years later, when companies have had time to mature in an enlarged and more liberalised market place.

It also allows an analysis of different business sectors in the context of the effects of the key conditional variables which impact firm performance.

To summarise, this model seeks to enhance the results by adopting a multi valued treatment approach, which can loosely be described as a form of interaction, where the additional key variables can be added to the membership variable to assess whether

any specific firm characteristics provide a further effect. The analysis goes further than an absolute comparison between member and non-member firms and provides relative data where each multi valued result in each treatment category can be compared with all the other categories, whether within or outside the EU. This results in a comprehensive analysis, not only of the effect of EU membership on the productivity of firms, but the influence of the effect of all the determinants measured on the treated groups against the untreated.

The key findings are that EU member firms are more productive than non-member firms, with the additional variables enhancing the effect. However, those effects are less marked in 2013 indicating that a degree of convergence has taken place. Outside the EU, firms receiving the additional treatments are more productive than those that do not.

Chapter 5 utilises the QTE model, also a treatment estimator, and therefore it is important to identify the difference between the approach taken by IPWRA and the quantile estimator. The IPWRA model is concerned with mean effects and does not reveal the extent of any differences in the distributional effects of the dependent variable, or the influence of the conditional variables, at points along the distribution curve. The QTE model however, measures the effect of EU membership on the productivity and profitability of firms across their respective distribution curves, using a quantile treatment effects model where the treatment is EU membership. It allows the identification of the effects of other independent variables on the conditional distribution of the outcomes of interest, namely productivity and profitability. Essentially, firm performance is measured in relation to EU membership at each percentile of the distribution curve, with the significance and strength of the coefficient generated together with the influence of key variables. The model has the ability to allow essential heterogeneity in the treatment parameters, providing an informative analysis of the impact of each of the key determinants on each percentile of the productivity and profitability distribution curves.

The chapter analyses results for productivity and profitability in 2005 and 2013, including disaggregating the manufacturing and service sectors, to provide a comprehensive view of behaviour in each business segment. The introduction of profitability as an additional dependent variable is justified as a robustness check in

relation to the productivity results and, because heterogeneity is to some degree controlled, is more likely to provide reliable results. However, it has only been possible to calculate profit at the gross margin stage due to paucity of data.

The main conclusion from this chapter is that, whilst all firms benefit from membership, the greatest benefit is to the least productive and profitable. This suggests that these firms, confronted by imported competition, either exited the market or improved efficiency to improve competitiveness.

Gains for ownership are seen in firms that are foreign owned, with significance seen uniformly across the distribution curve. The result for domestic firms is more nuanced as gains are seen amongst the most productive, indicating that spillovers may be limited to the upper echelon. In relation to productivity, there are marginal gains for exporters and more profitable firms increase their profitability. Firms in receipt of loans show a uniformly positive significant across all percentiles, demonstrating the importance of finance in improving firm performance. The disaggregated results are more nuanced with both manufacturing and services showing important differences.

Chapter 6 concentrates exclusively on the Balkans region, the motivation for which is twofold. Firstly, there is evidence in literature that, because of its recent history of war and conflict, there exists a negative Balkans effect. Secondly, there is the potential to evaluate any differences in firm performance between those in the three NMS of Bulgaria, Croatia and Slovenia and Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, and Serbia; countries in the pre-accession process. Thus, the motivation is to determine whether there are any performance comparator differences between this region and the sample as a whole. For example, intuitively one would expect a greater degree of convergence between member and non-member firms as a result of the pre accession process.

This chapter also provides an opportunity to observe whether there are different dynamics at work between the current EU members and those in accession, as opposed to observations of the population sample as a whole. Equally, the chapter concentrates, not only on EU membership, but also access to finance and the importance of capital in relation to firm performance, which provides an added dimension to the loan story. The data also allows additional variables, including capital, to be introduced and

analysed, which provides further substance to the overall debate. Only the 2013 BEEPS data is analysed, since only Slovenia was a member in 2005 and, as hostilities in the region had not long ceased, measurement was problematical. The two models used are QTE and IPWRA.

The results within the IPWRA model are broadly similar, albeit, that there is some evidence that firms within the EU are more productive than their non-member peer group, with the quantile results suggesting that there might be a greater degree of convergence. In broad terms, the importance of access to finance is confirmed both in terms of loans and rental capital (leasing finance) with greater utilisation of the former in the service sector and the latter in manufacturing. Indications for both forms of finance are that they are more effective at the lower end of the distribution curve, which may suggest that the more productive firms are better capitalised.

Chapter 7 concludes the thesis with a summary of the results and conclusions, referencing theory and extant literature. It includes policy recommendations, limitations of the thesis and indications for further research.

1.6 Contribution to Knowledge and Literature

This research contributes by identifying the opportunity to create a laboratory to test the most fundamental claims of the Washington Consensus programme that market liberalisation, free flow of funds, privatisation and the development of state political and economic institutions are a paradigm for the improvement of national welfare. The internalisation of the WC programme by the EU (Fitoussi and Saraceno 2013) has provided such an opportunity to carry out an evaluation at the microeconomic level with the added benefit of being able to contextualise the research with political and macroeconomic dimensions. This brings a holistic narrative to the issue of policy reform, an important topic within economic literature, with a study of a paradigm that has underpinned policy over the last two decades and is an important contribution to knowledge. A comparison of the new member states (NMS) of the EU as recipients of the WC programme, with states also in transition with a similar socio-economic background but only a limited application of the same paradigm, provides a treatment and control group not previously evaluated in depth. Additionally, the fusion of specific variables, identified in literature as being influential in terms of firm level

performance, within the treatment group, allows the identification of areas of strengths and weaknesses in the key drivers of trade.

The literature review covers a range of subjects relevant to the research including context to the political economy background, the expansion of the EU and the consequent significance of the free flow of funds into the NMS. This led to multinational enterprises dominating the manufacturing sector with vertical investment into international production network whose output was designed entirely for export. The data chapter provides the macroeconomic background and an introduction to the BEEPS survey and variables relevant to the WC programme. The importance of these two chapters is that they provide an important review of relevant knowledge which informs the empirical results and are in themselves an important contribution to literature in that they summarise extant knowledge.

The empirical chapters, utilising matching models, indicate that firms within the EU are more productive than those outside with the additional key variables of FDI, exporting, loans and innovation providing a small additional advantage. This indicates that institutional development is key to firm level performance albeit the distributional effect suggests that the least productive and profitable firms gain the most benefit. The service sector gains a greater advantage than manufacturing with the latter impaired by the vertical nature of investment into IPNs with their high level of transnational inputs which limit valued add to labour and create an environment in which it is difficult to achieve an export multiplier. A further negative implication is the lack of spillovers into the domestic economies with foreign owners having no necessity to share technology with domestic firms. In contrast, service sector investment is in the majority and is horizontal in nature. It has resulted in the rapid development of a sector capable of supporting a market economy including the manufacturing sector and this is allied to the necessity of sharing intellectual property with domestic firms providing a spillover effect.

The effectiveness of loans in enhancing firm performance is universally recognised but this is marred by apparent evidence of market failure which restricts finance to a small minority of firms. The Western Balkans chapter provides further evidence of the importance of institutional development where non-member firms show a greater

degree of performance convergence which may be due to the fact that they are already in the accession process.

The fusion of the contextual nature of the literature review and data chapters with the empirical results provides a rich vein of evidence that indicates the efficacy of the WC programme within a microeconomic environment. The comprehensive nature of this research and its findings in relation to firm level performance justifies a claim that it is a contribution to literature providing evidence that the essential tenets of the WC programme is advantageous at the microeconomic level. However, research conducted in this area at the macroeconomic level paints a contradictory picture with this research's results with the manufacturing sector providing some evidence as to the root cause. This suggests that the strength of capital dwarfs other considerations and distorts the economic environment leading to asymmetric fiscal and infrastructure policies detrimental to national welfare.

1.7 Conclusion

This chapter outlines the thesis proposition that the WC programme became, and has continued to evolve into, the adopted paradigm for the economic development of emerging and transitional economies on the basis that it has been internalised by the EU as the conditional protocol for accession acceptance. Its efficacy can be empirically tested by the performance of firms in the NMS against a control group in the SEE and CIS. The thesis examines the basic research question of whether EU membership benefits firm performance and, to evaluate the proposition, uses five key themes; the influence of ownership; the advantages of exporting; the efficacy of loans and the impact of innovation. Two empirical approaches are utilised, namely, the IPWRA and QTE models, using BEEPS data for evaluative purposes.

In addition, descriptive statistics from the World Bank are adopted to provide additional information and economic and geopolitical context. Two time periods are used, 2005 and 2013, the former being one year after the accession of the majority of the NMS and the latter to establish whether any changes have taken place as firms mature under a more liberal market regime. The results are disaggregated to establish any differences between the performance of firms in the manufacturing and service sectors.

The thesis will therefore consist of seven chapters: the introduction which includes research philosophy, motivation, aims and objectives, followed by a literature review to identify research gaps, including trade liberalisation, financial flows, privatisation, foreign ownership, international trade, tariff reduction and innovation.

It will also cover the effect of the WC programme on the transitional economies of Eastern Europe and its internalisation by the EU. The identified gaps will form the basis of the hypotheses on which the thesis will be constructed. Three empirical chapters include firm level microeconomic analysis, including the characterisation of firm structure and ownership, the influence of exporting, capital, loans and innovation, allied to the overriding effect of EU membership on firm level performance. Discussion will include an analysis of the influence of institutional and financial development on the business and investment climate affecting transitional firms. The final chapter focuses entirely on the Western Balkans and is based on a paper already published in a peer reviewed journal, Economic Annals, in 2017. Further papers on productivity has been published in the Journal of Economic Asymmetries in 2015 and in the IZA World of Labour series in March 2019. Aspects of the thesis have been presented at conferences at Bournemouth University, Manchester Metropolitan University, Roma Tre University, University College London, Freiburg University and the Economic University of St Petersburg, where valuable feedback was obtained to inform and guide the research.

Chapter 2 Literature Review

2.1 Introduction

This chapter is designed to establish what has already been covered on the subject of the Washington Consensus programme, its efficacy contributing to the development of emerging and developing economies, the claim that it was internalised by the European Union and that it forms an essential part of the *Acquis Communautaire*.

The thesis seeks to establish the relevance of the programme in economic terms and, since it is predicated primarily on trade liberalisation, privatisation and macroeconomic and institutional reforms which underpin the main tenets, it uses firm performance as its measure. It utilises variables which feature in trade literature and addresses four specific themes in addition to EU membership, namely, firm characteristics, globalisation, access to finance and innovation. However, these themes demand the exploration of the influences surrounding their selection as determinants of firm performance. Thus EU membership is associated with institutional reform; firm characteristics with age and size; ownership with foreign direct investment (FDI), privatisation, international production networks and exporting; access to finance with loans and capital availability, and innovation with research and development. Therefore, the literature review includes the relationship between the themes and their key determinants and identifies gaps in knowledge that generates the hypotheses on which this thesis is predicated. However, neither the WC programme nor the EU accession process can be viewed in economic isolation, and a political economy dimension must be introduced to complete the picture, provide a necessary perspective on the interpretation of the results, and provide an appropriate contribution to knowledge. To satisfy this aspect of the research, a limited review is undertaken of the ideological paradigm elucidated in the WC, together with some of the socio economic consequences of EU accession.

2.2 Washington Consensus Programme

The Washington Consensus (WC) was a description coined by John Williamson who "argued that the set of policy reforms which most of official Washington thought would be good for Latin American countries could be summarized in ten propositions:

- Fiscal discipline.

- A redirection of public expenditure priorities toward fields offering both high economic returns and the potential to improve income distribution, such as primary health care, primary education, and infrastructure.
- Tax reform (to lower marginal rates and broaden the tax base).
- Interest rate liberalization.
- A competitive exchange rate.
- Trade liberalization.
- Liberalization of Foreign Direct Investment inflows.
- Privatization.
- Deregulation (in the sense of abolishing barriers to entry and exit).
- Secure property rights" (Williamson 1989).

This 10-point reform programme, known as the Washington Consensus, prescribed a template by which the developing world could achieve macroeconomic stability and improved national welfare. Williamson has since argued that both supporters and detractors have chosen, erroneously, to interpret his paper as a gospel for neoliberal ideas, although the term is now used universally to describe the actions of the Washington influenced International Monetary Fund (IMF) and the World Bank (WB) in pursuit of their versions of global welfare (Williamson 2000).

Fiscal discipline was defined as an imperative to reduce large deficits, with the objective of controlling adverse balance of payments problems and inflationary spirals. It was intended to go hand in hand with changing public expenditure priorities to encourage growth, including the improvement of education, healthcare and infrastructure. In a free market context, this pro-growth and pro-poor expenditure priority has been interpreted as emphasising the former whilst relying on reduction in government expenditure to control the deficit (Williamson 2009).

The intention of the reform of taxation was to ensure a broad tax base allied to a more moderate marginal rate which, together with the liberalisation of interest rates and the creation of a competitive exchange rate, was intended to reduce the amount of government control creating barriers to economic growth. In so far as this element of the reform programme has been pursued, it has been interpreted as a need to reduce

taxation generally, allow markets to control interest rates and establish floating exchange rate regimes (Williamson 2000).

Trade, inward foreign direct investment (FDI), liberalisation and privatisation were not originally intended to be interpreted as the neoliberal paradigm they have become. The speed of liberalisation, the comprehensive nature of the freeing up of capital accounts and the manner of privatisations, were not intended to have the destabilising effects that have been witnessed globally. This applies equally to deregulation. The intention was for it to be an exercise in tariff barrier reduction, whereas it has become a paradigm for reducing regulations of any kind, including those designed for safety, the environment, or for the protection of non-competitive industry (Gore 2000). In relation to property rights, it was an attempt to provide a legal structure for a more universal property-owning society, which included the empowerment of the informal sector. However, it has been utilised to strengthen the hand of vested interests (Williamson 2009).

The WC is essentially a construct of the key tenets of the International Finance Institutions (IFI), in particular, the IMF and the WB. Their prescription for the improvement of national welfare is based on the influence of both the American government and the economic elites of the major universities who have espoused the benefits of neoliberalism for the past two decades. By the very nature of the constitutions of these two institutions, the product is for export only, with a packaged policy of one size fits all, predicated on conditionality; the provision of money in return for policy reforms (Babb 2013).

Krugman (1995) believed he had written the obituary of the Washington Consensus only to see it continue to flourish from South East Asia to Latin America and across to Southern Europe. In reality however, the IFIs have not created a post WC environment, but developed and augmented the process in the light of criticism and experience. The paradigm has been widely criticised and therefore conceptually weakened, although there is no evidence to suggest that an alternative has been developed to justify the descriptor of “post Washington Consensus” (Babb 2013 pp.291).

Danni Rodrik (2007 pp.973) stated “Proponents and critics alike agree that the policies spawned by the Washington Consensus have not produced the desired results. The debate now is not over whether the Washington Consensus is dead or alive, but over what will replace it”. However, in the same paper, he admitted that Washington institutions were already advocating an augmented WC, including a greater role for financial and state institutions, a more flexible labour market and a greater role for the World Trade Organisation (WTO). This may suggest a change of emphasis from policy to institutions. Those countries that adopted the “shock” therapy promulgated by the Washington Consensus, found that loosening the ties of the state created a weak bureaucracy incapable of controlling the powerful entities of deregulation, capital flows and privatisation. Thus, the notion that a weak state and the freedom that it brings guarantees prosperity, is discredited (Rodrik 2012). Literature tends to focus on transition or developing economies, defined as economies in transition from a command to a market economy, with a need to develop institutional and structural systems to support the change process. Literature analyses particular world regions with differing economic paradigms, cultures, religions and political ideologies, which exacerbates the difficulty of arriving at empirically based universal conclusions. Criticism of the approach is that it is too prescriptive and fails to take into account these issues, together with the welfare needs of individual countries; “the evidence is now in, and it is clear that it does not work well enough. The dominant economic orthodoxies have failed to generate sustained economic growth, poverty reduction, and fair outcomes in many parts of the developing world” (Held 2005 pp. 99). There has been a degree of critical commentary from the Asian financial crisis of 1997 through the contrasting experience of Latin America, where the benefits of reform were outweighed by lack lustre growth allied to an increase in inequality and poverty, to the Eurozone crisis that engulfed Portugal, Ireland, Italy, Greece and Spain (PIIGS) with increasing claims that the WC programme is flawed (Schmidt 2010; Rodrik 2012).

In relation to Asia, it can be argued that the financial crisis of 1997 was actually caused by the IMF, firstly by an overreaction to the devaluation of the Thai Baht, which caused a speculative run on other Asian currencies, including Australia and New Zealand.

Secondly, by shuttering banks to a degree that caused capital flight on an industrial scale (Sachs 1998). This was accompanied by an apparent inability to understand the

debt to equity ratio of Asian companies, which are inversely related to their Western counterparts mainly due to the high savings rate prevalent within Asia. The subsequent fall out led to bankruptcy, against a background of an inadequate legal system and predatory behaviour by Western capitalists seeking undervalued assets (Wade & Veneroso 1998).

The Asian experience contrasts with the Latin American Experience in that the hegemony of the US has always resulted in tensions unique to the region, alleviated by the post war success of the Import Substituting Industrialisation (ISI) programme. This was an attempt primarily by developing countries to replace manufactured goods imported from the developed world. Domestic production facilities were established and tariffs imposed to protect the newly emerging industrial base (Baer 1972; Franko 2007). However, the internalisation programme stalled in the late seventies and Latin American countries were forced to look to the US and the IMF for assistance with its rising debt, runaway inflation and the flat lining of GDP growth. The imposition of the policy reforms of the Washington Consensus programme undoubtedly brought a number of benefits, particularly in relation to capital flows, reduction of inflation and eventually stabilisation of currencies. However, these advantages were outweighed by lack lustre growth, a continuing failure to improve productivity and competitiveness, and in many ways, allied to an increase in inequality and poverty (Krugman 1995 & Franko 2007). Of particular interest is the effect of the reform package, which arguably has been found most acutely in Mexico due to its proximity to the US and membership of the North American Free Trade Agreement (NAFTA). It is self-evident that American influence, deeply resented amongst Latin American states, has created an economic environment designed to provide maximum benefit to US businesses (Grugel & Riggirozzi 2012). There now exists a more Keynesian trend which, whilst not abandoning the beneficial reforms of the IMF, has introduced a more state interventionist approach to economic development, where the need for a more inclusive society is recognised as part of a key goal of government policy. This has its problems, but the success of Brazil's anti-poverty programme and Mexico's cash transfer initiatives may be a prelude to a new more statist paradigm, which will provide a better welfare outcome for the nation states (Bresser-Pereira 2010). The issue is whether the vested interests in the US will allow this to happen.

One has to return to the literature of the 1990s for a body of evidence that is supportive of the WC programme (see Dollar (1992), Sachs and Warner (1995), Edwards (1998), and Romer and Frankel (1999), although the subject has recently been revisited by academics who recognise that the term is a reasonable description of the neoliberal agenda prevalent today (Babb 2013, Estevadeordal and Taylor 2013). Whilst Babb (2013) emphasises the evolution of the original concept, Estevadeordal and Taylor (2013) find empirical evidence to justify their claim that, from the perspective of trade liberalisation, the augmented WC is alive, well and justifying its policy claims. Their paper is an attempt to measure empirically the efficacy of the WC programme against a control group, where they assemble a country group of liberalisers, based on tariff reduction, against a group of non-liberalisers. They find that:

> *"the effect on the developing country liberalisers is that the impact of tariff reduction looks quite beneficial and has a plausible magnitude consistent with theory. The effects we find are not so large as to be dismissed as implausible, but at the same time, our effects are still large enough to make a nontrivial cumulative difference in outcomes over the longer run. An extra 1% of growth each year may not sound like a lot ……. is there any other single policy prescription of the past twenty years that can be argued to have contributed between 15% and 20% to developing country incomes?"* (Estevadeordal and Taylor 2013).

The evolution of the WC programme into what has been described by a number of scholars as the augmented WC perspective includes:

The Original Washington Consensus items, plus:

- Corporate governance
- Anti-corruption
- Flexible labour markets
- World Trade Organization agreements
- Financial codes and standards
- 'Prudent' capital-account opening

- Non-intermediate exchange rate regimes
- Independent central banks/inflation targeting
- Social safety nets
- Targeted poverty reduction (Marangos 2009)

Thus the debate continues, whether the addition of this augmentation reflects the demise of the WC and whether we now enter a post Washington Consensus world. The reality is that the WC programme came under pressure from the problems of implementation, as the differing economic and political problems of the various nation states met the conditionality imposed by the IFIs (Naim 2000). Neither the WC, the augmented WC nor the post WC programmes were ever a universal consensus. Easterly (2001), Rodrik (2002, 2006), and Stiglitz (1998,2000,2002) were particular and constant critics: the augmented WC having been drawn up by Rodrik (2007) as an objection to the original and continuing attraction of the WC to the IFIs, and to their continued application of the conditional approach to developing economies (Marangos 2009). Gereffi (2014) claims that global value chains and the emergence of competitive regions of economic and political influence mark the end of the WC. However, although there may have been a number of iterations, variously described as "augmented, "post" or "after", the WC has not been replaced by an alternative paradigm. The neoliberal consensus that unites Western governments, the political and corporate elites and the fragmented nature of the development economic debate, shows little sign of abating, therefore "it seems likely that no transnational policy paradigm will replace the Washington Consensus in the near future" (Babb 2013 pp.291).

It is important to emphasise Williamson's (2009) objection to the comparison of the WC programme with neoliberalism, which he states emphatically in a paper entitled "A Short History of the Washington Consensus":

> *"[W]hen a serious economist attacks the Washington Consensus, the world at large interprets that as saying that he believes there is a serious intellectual case against disciplined macroeconomic policies, the use of markets, and trade liberalization-the three core ideas that were embodied in the original list and that are identified with the IFIs.*

> *Perhaps there is such a case, but I have not found it argued in Stiglitz (2002) or anywhere else. If the term is being used as a pseudonym for market fundamentalism, then the public read into it a declaration that the IFIs are committed to market fundamentalism. That is a caricature. We have no business to be propagating caricatures".*

Nevertheless, it is difficult to argue that the WC programme has not become a shorthand term for the neoliberal agenda. Furthermore, there is significant literature implying that Williamson is being disingenuous when he distances himself and his creation from neoliberalism. There are claims that globalisation itself is not the issue, but the form of it promulgated by the WC programme, which is the root cause of poor economic performance and deterioration of national welfare (Chang and Grabel 2004a, 2004b; Marangos 2014). As a student of Fritz Machlup, a prominent member of the MPS, Williamson himself makes the connection between the Mont Pelerin Society, neoliberalism and the WC (Williamson 2003). However, this research study limits itself to the effect of the programme in relation to firm level performance.

2.3 A Political and Sociological Perspective of Neoliberalism

It is important to distinguish between classical or neoclassical liberalism and neoliberalism, since there is evidence of some confusion. The success or failure of the neoliberal paradigm is debated against a backdrop of its perceived hegemony since 1980, when the Thatcher led conservative government in the United Kingdom and the Reagan led administration in the United States championed Hayekian economic policies in the interests of their perception of national welfare (Harvey 2007). This contention of state capture has its roots in the Hayekian and Friedman inspired school at the University of Chicago, which itself grew from the Mont Pèlerin society founded in 1947. The founding members were Friedrich Hayek and Milton Friedman and amongst others, Ludwig von Mises, James Buchanan and Karl Popper. This context is of interest since three of these economists have received the Nobel Prize for Economics. The Chicago School was pivotal in the creation of partisan economic think tanks like the Institute for Economic Affairs in London and the Heritage Foundation in Washington DC (Mirowski and Plehwe 2015).

Straying into the field of politics and sociology, there is a persuasive argument that the influence of neoliberalism and its apparent dominance of economic thought and practice is the result of a “thought collective” ("Denkkollektiv" in German). This was developed by Polish/ Israeli physician, Ludwig Fleck, to explain how a cohort of researchers jointly develop and elaborate, from a shared framework of ontological and epistemological ideas, knowledge, experience, beliefs and cultural background to produce a universal truth in relation to a particular concept (Harwood 1986).

In relation to neoliberalism, the claim is that members of the Mont Pelerin Society, through Hayek and Friedman, became influential in both the Chicago School of Economics and the London School of Economics and both these establishments became thought leaders in the post war debate between Hayek and Keynes. The fact that the individuals purportedly leading this thought collective have continually denied its existence, is an argument that is unappealing to leading researchers on the subject. Mirowski (2014) claims that:

> *“[W]hat is noteworthy about the neoliberals is that they forged a unified doctrine and institutional structure to do just that: they can reassure themselves that no human being is capable of second-guessing the Truth of the Market, and therefore spreading ignorance about their own true motives is not duplicity, but rather, foaming the runway for the bearers of real civilization to land and take over. There is no better modern exemplar of the core of the Straussian political doctrine of the noble lie”.*

Whether there is empirical evidence to support the claim that the five hundred members of the Mont Pelerin Society had a profound effect on economic outcomes and policy, is addressed in these research papers. The Marxists held the view that capitalism should be encouraged and supported to such a degree that that an overly repressed proletariat would rise and support their political objectives (Mirowski 2014). However, the real evidence exists in the actual events and in the known members of the society who emerged since the transition from Keynesianism to neoliberalism in the early 1980’s. Following the Pinochet coup in Chile against the democratically elected socialist government of Allende, which chimed with the collapse of the Import Substitution programme that had successfully regenerated much of South America, the

subsequent recession required an economic solution. It came in the shape of a cohort of United States economists who became known as the "Chicago Boys" due to their allegiance to the teaching of Milton Friedman. From the point of view of the Chilean economy, their successful introduction of what subsequently became known as the Washington Consensus programme was the direct application of all they had been exposed to while studying at the Chicago School, and the shock tactics they implemented received Friedman's full support (Silva 1991). Solow (2013) regarded him as an ideologue, echoing his support of Reagan and Thatcher, and stating, "I think that Milton Friedmans are bad for economics and bad for society"

A body of opinion claims that the Western world did not have a monopoly on neoliberalism. Prior to the end of Soviet hegemony in Eastern Europe and Central Asia, academic economists in the region were part of a transnational network sharing with Western participants the results of what was seen as the impact of socialism against a background of the neoliberal thought collective (Bockman and Eyal 2002). These academics espoused the view that such transnational conversations formed the bedrock of the ready acceptance of neoliberal reform in Eastern Europe and Central Asia, which in turn suggests an international alignment of the Mont Pelerin thought collective.

2.4 The Internalisation of the Washington Consensus within the European Union

The most recent examples of the programme in action are found in Europe, although it is first necessary to contextualise the reference. Literature suggests that the EU has gone further than any other group of member states to embrace the principles of the WC and, while there is significant reference to the WC, what is "less widely recognised is that there really exists only one pure laboratory experiment implementing the Washington Consensus in the Western World: Europe. [It] ……. has gone very far in the internalisation of the Washington Consensus; in fact, it has devised constitutionally a form of government that has no choice but to implement it" (Fitoussi and Saraceno 2013 pp. 1). It can be argued that, in so doing, Europe laid the foundation for the poor growth it is currently experiencing. There is also some evidence of convergence of IMF and EU funding policies, with the EU adhering to a much more orthodox monetary regime than the IMF (Lutz and Kranke 2014).

Essentially, the new member states of the EU had no choice but to incorporate the *Acquis Communautaire* (accumulated body of EU law and protocols since 1958) into their legal and regulatory administrations. Whilst the accession states had no choice but to engage completely in the process, it is irrelevant whether the debate is based on the WC programme or any augmented or post application. To have done otherwise would have led to denial of entry. Those Western Balkan countries in the accession process face the same dilemma in a one-sided negotiation, where the conditionality of membership is non-negotiable (Lavigne 2000). This will result in the same systemic change as that enforced on the countries of Central and Eastern Europe.

Following the Eurozone crisis, the internalisation of the WC can be epitomised in the formation of the Troika, consisting of the European Commission (EC), the European Central Bank (ECB) and the IMF, to bail out Portugal, Italy, Ireland, Greece and Spain (the PIIGS). The policy of austerity, demanded in return for money, is the very bedrock of the IMF's strategy of external conditionality and serves to demonstrate the extent to which the EU has internalised the WC (Featherstone 2015). This view is further emphasised by the crises in Hungary, Latvia and Romania in 2008/09 when the EU and the IMF cooperated to provide a rescue package. It should be noted that the conditionality imposed by the EU was far stricter than recommended by the IMF (Lutz and Kranke 2014).

There have been a multiplicity of interpretations of the WC policy, although the reality is that it is associated with orthodox macroeconomic policies established and pursued by international financial institutions, including the IMF and the EU. It was the EU however, which proved the most recalcitrant, pursuing an aggressive contractionary and pro cyclical programme conditional on the award of loans to Hungary, Latvia, Romania, Greece, Ireland and Portugal (Marangos 2009a and 2009b; Lutz and Kranke 2014; Babb 2013). A particular example was its treatment of Romania where severe austerity measures were demanded, including a 25% cut in public sector pay and a 15% cut in pensions, followed by further cuts in return for additional funds. In contrast, the IMF believed a far less austere regime could have been agreed. This demonstrates that, by internalising the WC programme, the EU's adherence to the established paradigm necessitated a far stricter observation of economic orthodoxy (Lutz and Kranke 2014).

The complete supremacy of the EU Commission is apparent in the control exerted at supranational level on trade, competition and, in the case of the Eurozone, through the monetary policy of the European Central Bank. Even in the area of fiscal policy there are constraints established by the Stability and Growth pact. Essentially therefore, the neoliberal agenda is established with the reduction of the presence of government, insistence on a balanced budget, control of inflation and the increase of competition through market mechanisms (Fitoussi and Saraceno 2013). Add the privileges of the common market and the customs union, and an augmented WC programme is complete.

2.5 The Transitional Countries and Process

The relationship between the institutional paradigms of the EU and IMF provide the opportunity for several strands of research at the microeconomic level using firm level data. Neoclassical orthodoxy hypothesises that privatisation, trade liberalisation, international trade, foreign ownership and access to finance, including FDI, have a beneficial effect on national welfare. Within the WC, these key areas are described as trade liberalisation, FDI flows, privatisation and deregulation.

The existence of the economies of Eastern Europe at arguably three different levels of transition, allows for an analysis of the efficacy of the WC programme on the performance of firms in regions that have adopted either a total or piecemeal application. In the NMS of the enlarged EU, there is evidence that protocols that led to accession were essentially based on the Washington Consensus programme, as epitomised by the EU. This programme was complete both in an institutional and economic sense (Fitoussi and Saraceno 2013). In countries of the former Soviet Union and Eastern Europe, the emphasis was on privatisation and the abolition of price controls, ignoring the weakness of institutions and the imbalances of supply and demand created by a command economy (Gabrisch and Hölscher 2006).

The transition process, following the collapse of the Soviet hegemony over its European and Central Asian states, was epitomised by the stark reporting of the tearing down of the Berlin Wall in November 1989. It is somewhat ironic that the symbolism of the collapse of the Soviet Union came in a state, namely, the German Democratic Republic (GDR), which was to have an extremely short period of independence. The

fall of the Berlin Wall and the growing realisation that the Soviet Union would not continue to bolster the repressive regime led by the East German Socialist Unity Party (SED) brought significant numbers of people out onto the streets in protest. Stripped of its protection, the SED was deposed and replaced with a government committed to the establishment of democratic rule. However, the country's economy was in a parlous state and the opening of the border with West Germany brought a wave of emigration which threatened to destabilise both countries. Therefore, for economic and public order reasons, reunification became inevitable and on the 23rd August 1990 the GDR declared its accession to the Federal Republic of Germany and therefore, by default, was also absorbed into the EU.

The disintegration of the Soviet Union resulted from factors which were political, cultural, and ideological and above all, economic, with several decades of economic stagnation (Svejnar 2002). The central planning functionality, which failed to balance supply and demand, allied to the significant expenditure of its military industrial complex, challenged the ideological appeal that had sustained the Soviet Union since its inception.

> *"In its last years the ideological appeal of the regime had long been dead, and its capacity to deliver economic growth had been exhausted. In 1990, among all the consumer goods in the Soviet Union only 11% could be found easily in the shops, the other 89% were consumer goods in shortage. So Soviet order was paralysed by the deadly combination of political stability and economic inefficiency"* (Krastev 2012 pp.3; Khan 2009).

The notionally independent states of Central and South East Europe (Poland, Hungary, Czech Republic, Slovak Republic, Slovenia, Croatia, Bulgaria, Romania, Serbia, Montenegro, Bosnia Herzegovina, Kosovo, Albania and FYR Macedonia) were free of the Soviet hegemon and figure 2.1 below shows their geographic location in relation to both the Commonwealth of Independent States and the major countries of the EU.

Figure 2 1 Political Map of Europe

Source: pocket-talk.org

The first eight states listed, together with the Baltic states of Estonia, Latvia and Lithuania, joined the EU between 2004 and 2013. The independence declaration of the Baltic States in 1991 was the forerunner to the departure, later that year, of the balance of states of the former Soviet Union (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan). A time line of events is shown in table 2.1 below. These are sovereignty declarations followed by independence within a relatively short timescale. Note that the dissolution of the Soviet Union did not take place until the 26th December 1991, by which time all states had already declared unilateral independence; a measure of the abrupt loss of control of the Union by the Soviets.

Table 2.1 The Date of Sovereignty and Independence Declarations of the New Commonwealth of Independent States

Country	Sovereignty Declaration	Independence Date
Azerbaijan	30 August 1991	18 October 1991
Georgia	18 November 1989	9 April 1991
Lithuania	18 May 1989	11 March 1990
Estonia	16 November 1988	20 August 1991
Latvia	4 May 1990	21 August 1991
Russia	11 June 1990	12 December 1991
Uzbekistan	20 June 1990	31 August 1991
Moldova	23 June 1990	27 August 1991
Ukraine	16 July 1990	24 August 1991
Belarus	27 July 1990	25 August 1991
Tajikistan	24 August 1990	9 September 1991
Armenia	23 August 1990	21 September 1991
Kazakhstan	25 October 1990	10 December 1991
Kyrgyzstan	15 December 1990	31 August 1991

Source: Author

The transition process, from a command to a market economy that began in 1991, led to a decline in output and a significant underestimation of the difficulties associated with achieving this transformation. (Svejnar 2002). Beginning in the mid-nineties, following this initial output decline, all economies began to recover, albeit at varying rates.

At this stage, it is appropriate to divide the transitional region into three distinct areas, namely the Central and Eastern European states (CEE) including the Baltics, the Former Soviet Union (FSU) and the Western Balkans, including Albania and the Former Yugoslav Republic of Macedonia (WB). This distinction allows the identification of the CEE as the accession states of the enlarged EU, the WB as the pre-accession states, and the FSU being members of the Commonwealth of Independent States (CIS), the latter being an economic bloc led by Russia. Following an initial decline, improvement began in the mid-nineteen nineties when the CEE and WB states fared better than those in the FSU, albeit that even amongst the former there were both early and late reformers. This was primarily due to the introduction of early

structural reform and stabilisation measures, allied to inflation control policies, which proved key to improved growth profiles (Fischer and Sahay 2000).

The use of all or aspects of the Washington Consensus programme was a key feature in the transitional journey and adopted by a number of states, including the provision of economic shock, rapid privatisation and price stabilisation. However, there were also states that rejected this approach, preferring a more gradual implementation of both price stabilisation and institutional reform (Gabrisch and Hölscher 2006). A total of seven states adopted and maintained the economic shock approach (Slovenia, Czech Republic, Slovak Republic, Poland, Latvia, Lithuania, Estonia) with a further four starting but aborting the process (Macedonia, Bulgaria, Albania, Russia). The balance, with the exception of Turkmenistan and Uzbekistan who elected not to reform, adopted the gradualist approach (Lenger 2008). The importance of the adoption of one or other approach is the subject of continuing debate, despite Popov (2000) claiming to have concluded the discussion by maintaining that the speed of transition was of secondary importance to the unevenness of the initial economic environments in each state, allied to the subsequent strength of the institutions. The debate is further complicated by the recipients of the shock therapy becoming EU member states, further compromising the apportionment of causality.

There is a universal acceptance of the importance of institutional development, but with this conclusion came the claim that those adopting economic shock as a means of transition, neglected this aspect, thus creating an unacceptable economic risk profile (Gabrisch and Hölscher 2006; Hölscher 2009). In contrast, Hartwell (2013) finds that those states that accelerated the speed of transition have made the most significant macroeconomic progress, which suggests that economic rather than political institutions are a more important influence. The economic institutions are defined as business freedom, ownership, size of state, financial and monetary entities, whilst the political are the type of government, judicial systems, executive and legislative powers, associated with the danger of corruption, abuse and state capture. Additionally, he claims that these states have successfully developed their political institutions to ensure support for a market economy. This would suggest that the driving force for political institutional development is the fast and successful propagation of economic institutional reforms, which in turn implies a degree of

support for the implementation of the Washington Consensus programme. It may therefore be that the relative economic success of the economic shock countries is tied to their striving to meet the criteria of the *Acquis Communautaire* and the conditionality imposed by the EU.

The WC and its 10-point implementation programme has been a source of controversial debate for the last two decades. Some scholars argue that it has been adopted by the EU, which has internalised it as a template for economic and financial governance within the community. However, it has been much criticised in relation to its rationale and negative implications for national welfare. The neoliberal concept embodied in the WC maintains that, in part, it provides a platform that encourages growth, improves income and alleviates poverty. Many dispute this believing that empirical evidence exists to disavow such claims. The WC programme emphasises the need for institutional reform, evidenced in literature as an important element of economic growth. In general, researchers have focussed on individual elements or countries, concentrating on specific cause and effects to determine outcomes. Where appropriate, their findings are then applied universally (Rodrik 2006).

There is universal acceptance that the NMS have benefitted economically from membership of the EU, but they still fall short of the ultimate objective of full convergence with the EU15, with a danger that the whole process will stagnate (Halmai and Vásáry 2010; Epstein and Jacoby 2014). The reality is however, that the economic benefits far outweigh any influence on democratic development and there is evidence of state capture on both the political and corporate fronts. While the NMS are economically more prosperous, and their actions recognise this, they continue to fall prey to populist illiberals who push the boundaries of the *Acquis Communautaire* and tolerate corrupt practices in pursuit of their own agendas (Epstein 2014; Houghton 2014, Jacoby 2010; Medve-Bálint 2014; Innes 2014).

An arguably greater challenge now emerges; the accession of the Western Balkan states. Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, and Serbia who are all in the accession process and present the EU with a dilemma, given the continuing challenges presented by those Eastern European countries who are already members. The issues raised by the ethnic wars of the 1990s still resonate today

and these must be resolved before accession can be contemplated (Vachudova 2014; Howard-Jones et al. 2018).

2.6 Key Themes of the Research

2.6.1 European Union Membership

The transition process in Eastern Europe and Central Asia has seen most countries adopt market orientated policies and create institutional environments in which to develop. However, the greatest progress has been made by those countries that have become members of the European Union with the process of accession encouraging economic and institutional reform (Cameron 2009). To some degree this was a process predicated on EU conditionality of membership, where the principles of enlargement were stated in the Copenhagen Council of 1993:

> *". . . membership requires that the candidate country has achieved stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities, the existence of a functioning market economy as well as the capacity to cope with competitive pressures and market forces within the Union. Membership presupposes the candidate's ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union" (European Council, 1993).*

This was a political process aimed at reinforcing peace and stability in Europe and creating a democratising environment in countries at the EU's Eastern border where previously there had existed a number of illiberal and authoritarian states which threatened peace. (Vachudova 2014). However, this political construct began to narrow its criteria throughout the 1990's, until the focus at the beginning of the 21st century was almost entirely a transition to a market economy, allied to macroeconomic criteria relating to deficits, debt ratios and price stability.

The process was not a harmonious one with the Southern European Union states expressing disquiet at the enlargement process and concern about the fiscal support available to them post enlargement (Agnew 2001).

Effectively the new member states of the EU have gone through a conditionality process having to adopt the EU systems of governance where rules are transferred from the Union to the accession state. The process is one of providing rewards in return for rule acceptance and implementation. It is graduated, beginning with financial assistance, trade agreements and finally full membership. It is a prescriptive, exogenous process where reward only follows acquiescence. The problem with this approach is that it loses its resonance post accession, when disgruntled rentiers have an opportunity to undermine the system in the absence of further incentives (Schimmelfennig and Sedelmeier 2004). The effect of membership suggests that the benefits are more economic than democratic, where continuing tensions reflect the historical divisions between Eastern and Western Europe with evidence that all the NMS have problems with democratisation (Epstein and Jacoby 2014).

However, this has to be placed in context. The EU was working towards the political stabilisation of Central and Southern Eastern Europe for a decade or more before any enlargement occurred and, whilst economic convergence between East and West continues to be a distant prospect, there is little doubt that membership of the EU provides more economic opportunities (Epstein 2014; Medve-Bálint 2014; Jacoby 2014; Langbein 2014). Additionally, the requirement to adhere to the *Acquis Communautaire* curbs the worst excesses of authoritarianism and gives some comfort to the liberalisers that reform is still achievable (Sedelmeier 2014; Haughton 2014; Dimitrova and Buzogány 2014; Langbein 2014).

In relation to firms, the impact of the Washington Consensus programme and accession to the EU pivots around privatisation, FDI, firm ownership and exports. Agency theory suggests that privatisation would strengthen the principal/agent relationship and the management team's motivation to improve performance. Findings in literature suggest that privatised firms in foreign ownership or investment display efficiency improvements whereas those in domestic ownership do not. Possible reasons for this may centre on governance and the strength of institutions, with foreign investors providing firms under their ownership with clear managerial and technological support to ensure compliance by local management. In the domestic arena the agency relationship is ill defined, giving the management team too much autonomy (Buck et al. 2008; Meyer and Peng 2005). However, the route to foreign

ownership was not necessarily direct since, at the beginning of the privatisation process, there is little evidence of FDI with transactions being limited to domestic participants and it is these who subsequently encouraged the substantive flow that emerged (Bevan et al. 2004).

The most important elements of FDI into the transition economies of Eastern Europe appear to be labour costs, proximity relating to the gravity theory, market size and institutional development (Bevan and Estrin 2004; Bevan et al. 2004; Meyer and Peng 2005). The institutional factor being particularly relevant in that the conditionality imposed by the EU on candidate states for membership, ensured a strong institutional platform, which underpinned potential investee decision making. Additionally, the gravity model is important as the bulk of FDI came from countries with close proximity to the NMS, particularly Austria and Germany. The motivation was twofold; firstly, horizontal investment to take advantage of market and price liberalisation and, in the case of the service sector, the development of market orientated support mechanisms and opportunities in utilities. Secondly, vertical investment designed to exploit the comparative advantage of cheap, skilled labour aimed at incorporating firms into international production networks.

The objective being to import technologically complex inputs for assembly using lower cost labour, thus increasing value added to the investing company. This latter form of investment has proved important in relation to export volume from the NMS, but has not necessarily benefitted domestic firms in relation to knowledge and technological spillovers, other than those with foreign investment or part of the upstream supply chain (Hunyar and Richter 2011, Bučar et al. 2009; Javorik 2004; Markusen and Venables 1999).

Exporting from the NMS is dominated by foreign owned firms; however, this is primarily as a result of vertical investment and membership of international production networks. The significant volume of technological inputs results in cheap labour being the only major source of value added and reduces the opportunity for an export multiplier.

This impacts negatively on GDP and is exacerbated by repatriation of profits and unfavourable exchange rates (Böröcz 2012). Additionally, the dominance of foreign

firms and the perceived economic necessity of encouraging FDI in the competitive environment of the accession countries, has led to the danger of corporate state capture (Drahokoupil 2008; Fernandes 2009; Blagojevic and Damijan 2012; Innes 2014). The subsequent infrastructure expenditure on assets geared to the needs of foreign owners leads to an asymmetry detrimental to national welfare, including the potential for reducing the State's ability to improve absorptive capacity.

EU membership has undoubtedly benefitted the NMS, which are economically and institutionally improved as a result. However, the effects are not universally beneficial and fourteen years after the first eight countries joined the EU there is little sign of economic convergence and some evidence that the democratisation process is under threat. The overall effect is a suggestion that despite the benefits of EU membership there remains an East, West divide (Epstein and Jacoby 2014).

Hypothesis 1. Firms within the NMS are more productive and profitable.

2.6.2 Firm Ownership

The two seminal works on the nature and existence of firms have been written by Knight (1921) in his "Risk, Uncertainty and profit" and Coase (1937) in "The Nature of the Firm".

Both had a fundamental effect on the traditional economists' view of perfect competition in an unregulated environment governed by supply and demand, where the former attracted the latter and determined price, which was in turn controlled by price increases and the appearance of other suppliers attracted by the prices obtained. The subsequent reduction in price kept an efficient market in equilibrium (Smith 1776). Knight argued that, in these circumstances, profit should not be possible and introduced the concept of entrepreneurial risk and reward where the nature of transactional uncertainty motivated individuals to transfer the risk to a larger entity of a firm. Coase was more concerned with transaction costs and the manner in which the firm managed and minimised those costs by its organisational power and size (Demetz 1988).

Firms emerging within Eastern Europe lacked the entrepreneurial nature of Knight's risk and reward and the market orientated transaction cost of Coase, since they lacked a functioning capital market and a well- developed institutional support mechanism.

What has been observed is that the potential for firm growth depends on ownership concentration and the strength of institutional support. In the case of the former, the lower the ownership concentration the higher the problem of agency with the asymmetry of information allowing managers to pursue their own interests at the expense of shareholders and firm growth. Weak institutions limit the opportunity for firms to grow. However, as ownership concentration grows, a negative relationship occurs, with firms slowing their rate of growth. This may suggest a reluctance amongst controlling shareholders to allow the necessary additional capital to accrue for fear of diluting the benefits of ownership. Equally, in such a volatile relationship potential investors may be inclined to avoid the present dangers of agency (Balsmeier and Czarnitski 2017). Further observations suggest that in the absence of strong institutions and a developed market economy, a more informal structure of cooperation between firms is formed by pooling resources and creating an informal network, which provided a platform to survive and grow in a weak institutional environment, although such environments depend both on the ability of managers and the size of the transaction cost (Peng and Heath 1996).

The characteristics of firms in transition economies are, to some degree, influenced by the environment from which they have emerged. Older, larger firms have emerged from state ownership and a command economy into a price liberalised market economy as a result of a privatisation process but, as institutions and infrastructure develop, may find the new environment challenging (Shinkle and Kriauciunas 2010). Younger, de novo firms tend to be smaller and more entrepreneurial and demonstrate greater flexibility and growth characteristics. However, they are also the most financially constrained with a problem of access to finance (Beck and Demirguc-Kunt 2006). Particularly in the NMS of the EU, the emergence of significant flows of FDI has seen a proliferation of firms wholly or partially owned by foreign entities. These have proven more productive than domestic companies and led to the inclusion of NMS into international production networks and a burgeoning export trade led by foreign owned and more productive firms (Bijsterbosch and Kolasa 2010, LiPuma et al. 2013). It is therefore essential to control for these factors when measuring the key determinants of firm performance.

2.6.2.1 Firm Ownership: Age and Size

Larger, older firms are likely to have been the main target of the privatisation process and the most attractive to foreign entities recognising the potential for both horizontal and vertical investment. To put this into perspective, in 1989, firms in Czechoslovakia and Poland with fewer than one hundred employees accounted for 0.1% and 1.4% of employment respectively. This confirms the predominance of heavy industry (96.5% in Czechoslovakia) and suggests an emphasis, in economic terms, on the second round of privatisations, which involved the larger and, by definition, older firms (da Rocha 2015).

When evaluating the effect of firm age on productivity, there is evidence that older firms have a positive outcome within the EU but a negative one within the CIS. Prior to transition, given that all older firms would have been involved in the state planning process, this suggests a discrepancy between the restructuring processes of firms within the two regions.

The indications are that there was greater attention given to productivity enhancing restructuring within the EU than outside it, which may be the result of the significant level of foreign ownership. However, even when foreign ownership is compared within the EU and outside, the same result is observed. This may indicate a difference of approach in terms of knowledge and technology transfer between the two regions (De Rosa et al. 2015).

There is a tendency in literature to view size and age in the same dimension and growth models have been built based on the premise that they represent the same fundamental concept and enjoy a linear relationship (Greiner 1972). However, the age of firm appears to have a distinct effect on performance, regardless of size. There is evidence that, as they age, firms have higher levels of productivity and profits, lower debt ratios and a propensity to convert sales growth into increased profitability, although there is also contradictory evidence that aging firms suffer from deteriorating sales, productivity and lower profits (Haltiwanger et al 1999; Coad et al. 2013).

This contradictory evidence provides an opportunity for this thesis to contribute to the debate by analysing the effect of age of firms on productivity and profitability. The heterogeneity of both countries and firms may explain the contradictory findings,

although there are a number of influences at work. The selection effect is the result of attrition. The passage of time eliminates the least productive firms and increases the productivity level of the rest, indicating that there may not necessarily be any improvement in the performance of individual firms, but the net effect is an apparent growth in productivity as firms age (Janovic 1982). The aging process allows firms to gain more experience and knowledge in their productive process, which, in turn, results in productivity improvements as firms identify those processes that retard efficiency and thus create new techniques to resolve underlying problems (Vassilakis 2008). The de novo firms are particularly affected. From the outset they are in a cycle of learning, particularly when competing with older firms with market power, established supply chains and greater experience. Their survival depends on the intensity of their learning capabilities (Garnsey 1998; Sørensen and Stuart 2000; Chang et al 2002). Finally, the inertia effect can be created when firms fail to adapt to the new challenges of technology and market development. Failing to move with the times and adapt, they become prone to the predatory effect of the more productive and to the new entrants. (Coad et al 2013).

In the long run theory of production, all factors are variable. Arguably the most important are economies of scale and scope since, in the case of scale, the cost per unit of output is reduced and an expansion of product range provides further competitive advantage as overheads are spread across a broader range of output (Sloman and Wride 2009). Thus, size of firm provides advantages of both economies of scale and network effects. There is ample literature on the influence of firm size on markets and most support the long run theory of production, but there is little that explains why firms grow. The quality of institutions is a prerequisite for economic growth and provides the environment for both individuals and firms (North 1986, 1993). De novo firms appear to grow faster than older ones, although the rate of growth slows as firms' age (Navaretti et al. 2014; Coad et al. 2013).

There is considerable literature on firm age, size and growth in transitional economies, which can be condensed into highlighting the importance of institutional development, particularly the freeing up of markets, the protection of property rights and contracts, and the business specific determinants which flow from them. With developed institutions in place, FDI is particularly attracted to the privatised sector and domestic

firms are challenged by foreign importers (Wagner 2012). In his review of literature, Tybout (2003) concludes that foreign competition causes price cost mark ups to fall, and locally based firms to contract or even exit the market. International trade allows larger more productive firms to expand their market base creating greater efficiency, while exporters increase in size, are more efficient and supply better quality products. Hence, unfettered access to the developed market economies of the EU15, allied to increased competition as a result of imports from the same source, conform to Tybout's findings and new trade theory. Increased competition promotes greater firm efficiency with the least productive exiting.

FDI is attracted by either horizontal or vertical opportunities with the latter being part of international production networks capitalising on the comparative advantage of skilled cheap labour offered by the transitional economies, particularly those of Central Eastern Europe. The presence of exporting multinational enterprises and access to a wider market for goods and services, has resulted in the most productive firms self-selecting as exporters. Together with improved technology and managerial skills, the presence of increased competition has encouraged innovation in both the manufacturing and services sector. A combination of these factors increases productivity and profitability and contributes to national welfare (Hoekman and Smarzynska Javorcik 2006; Ter Wengel and Rodriguez 2006; Beck et al 2005; Shinkle and Kriauciunas 2010; Becker et al. 2010; Bijsterbosch and Kolasa 2010). It is therefore important in any firm level research to control for age and size.

2.6.2.2 Firm Ownership: Foreign Direct Investment

FDI and international trade theories have existed since Adam Smith (1776) postulated that markets both created and dictated trade. David Ricardo (1817) claimed that countries should concentrate resources on products in which they have a comparative advantage. Heckscher and Ohlin (1933) espoused a factor proportion theory whereby countries would specialise by utilising their most abundant resources to maximise comparative advantage. More recently, the discussion has become more nuanced when Hymer (1976), in his posthumous Ph.D thesis, argued that overseas investment was predicated on firm level advantage over internal competition and resources in the target country. In particular he developed the notion that multi-national enterprises (MNE's) were the main drivers of FDI. Hitherto, portfolio capital flows were the main

focus of international trade economists (Hymer 1976). This theory was further developed by Dunning who developed the eclectic paradigm of Ownership, Location, Internalisation (OLI) in which he proposed an approach that is encapsulated as; ownership, allowing an MNE to exploit firm specific advantages against competitors; location, that the firm has a choice of locale; internalisation, providing the operational capability of utilising assets to reduce costs in both the host and guest nation (Dunning & Rugman 1985).

The gravity model relates international trade flows to the distance between the exporter and importer, implying that the shorter the distance, the greater propensity to trade. Additional variables can be used to enhance the model including size of the economy, language and common borders. There is evidence that Germany, the near neighbour of the NMS, increased its business with the group in relation to both FDI and trade, to a significantly greater degree than any other state within the EU15, albeit that trade grew strongly with the Euro area as a whole. This conforms to the gravity theory of trade (Bussière et al. 2005)

The motivation for FDI is divided into three categories; horizontal, when the investment is internalised, platform, when the objective is exporting, and vertical, when the purpose is to utilise a country's comparative advantage within an international value chain. It is not the intention of this research to distinguish between them. Over the past 25 years, the proponents of FDI and trade liberalisation have argued that the presence of foreign firms has improved allocative efficiency, and that has become an accepted premise on which to base policy (Topalova & Khandelwal 2011). The empirical evidence is more contradictory however as different studies find both confirmatory and contradictory evidence, probably due to the different methodologies used in research.

By definition, the Washington Consensus prescription favours the advantages of trade liberalisation and it is therefore useful that studies have been conducted which allow a review of literature where countries have been the subject of such a regime. In India, when the balance of payments crisis in 1991 resulted in the IMF imposing trade liberalisation policies in a highly regulated and tariff driven regime, has yielded contradictory results from two particular research studies (Epifani (2003) and Topalova & Khandelwal 2011). The earlier study, which includes econometric

modelling based on previous research papers using firm level data, concludes that productivity improves following trade liberalisation, with reallocation of output share and that increased competitiveness of import competing sectors are the major winners (Epifani 2003). However, the same author finds that results for India contradict this trend, as a series of negative coefficients leads to the conclusion that, despite reform, India tends to be an over regulated and tariff promoting regime in need of further deregulation (Epifani 2003). Later work (Topalova & Khandelwal 2011) contradicts these findings claiming:

> *"this study contributes to the literature in important ways. First, this paper provides direct evidence that trade policies are endogenous to productivity levels, a fact that to our knowledge has not been previously shown. Moreover, we account for the endogeneity by exploiting a narrow time frame in which tariff movements are plausibly exogenous. Second, the paper not only disentangles the role of import competition versus access to better and cheaper inputs for productivity improvements, but also examines how this impact is shaped by industry, firm, and environment characteristics"* (Topalova & Khandelwal 2011).

Contradicting Epifani, they found the process improved firm level productivity with improved access to foreign inputs being a major contributory factor.

Using firm level data obtained from the World Bank Enterprise Surveys, Walkirch examines the effect of the presence of foreign firm across 118 developing countries. Using regression with fixed effects and measuring separately foreign and domestic firms, he concludes that any productivity gains are restricted to the cohort of foreign firms with, at best, only a marginal spillover effect on domestic firms. Encouragingly, he maintains that his work is only the beginning and further work needs to be undertaken, which is part of the object of this research (Walkirch 2014).

It is clear that work on productivity is at times contradictory with arguments both for and against the influence of FDI and trade liberalisation, particularly on domestic firm productivity. Essentially the argument distils into those looking at single countries (see Pavenik 2002, Amiti and Konings 2007, Topalova & Khandelwal 2011) who

found evidence of productivity improvements, and those researchers carrying out cross country regressions where the results are less conclusive, some finding that trade liberalisation has little or possibly a negative impact on a country's productivity (see; Freeman 2003; McMillan and Rodrik 2014). Significant literature on the subject seems to indicate heterogeneity between industries and firms within sectors, with some finding little spillover to domestic firms from the presence of foreign firms or capital. Productivity seems to be driven by the presence of foreign firms with superior technology and management, allied to the exit of less productive domestic firms. Furthermore, in the productivity gains achieved at firm level, there seem to be significant differences within industries (Greenaway & Kneller 2007).

Hypothesis 2. Foreign owned firms are more productive and profitable.

2.6.2.3 Firm Ownership: Privatisation

A key factor in the transitional process is the role of the privatisation of state owned companies. There was an assumption amongst economists that the privatisation programme undertaken by the Eastern European transition economies would result in a significant improvement in firm level performance. The result has been more nuanced, with firms bought by foreign investors being significantly more productive than those in domestic ownership (Gabrisch and Hölscher, 2006; Wagner, 2006; Estrin et al., 2009; Irdam et al. 2015; Waldkirch, 2014). The primary purpose was to encourage greater economic competitiveness, creating a more productive and efficient environment. Literature reveals that a more competitive market results in improved productivity (Bridgeman, 2010). Clearly, membership of the EU significantly increases the competitive environment.

Within the transitional economies, there were concerns about the development of competition policy, although these have been largely allayed (Gabrisch and Hölscher, 2006). Within the NMS, there is evidence that "a well-designed and well implemented competition policy has a significant impact on TFP [total factor productivity] growth" (Buccirossi et al., 2013; p.1334). The inclusion of competition is predicated on the new trade theory and specifically Tybout's (2003) conclusion relating to the effect of foreign firms on local pricing and firm survival. The influence of competition also resonates with international trade, which suggests that larger, more productive firms

increase in size and are more efficient. Thus, the breakup of state monopolies was an important event in the creation of increased competitiveness.

Three methods of privatisation were used, namely, direct sale, vouchers, and management and employee buyout (MEBO) and these were designated as primary and secondary. In Hungary, direct sale was the primary method with MEBO as the secondary. The direct sale method is self-explanatory and designed to attract large scale investors, particularly foreign entities bringing new technology and management expertise into firms with a monopolistic soft budget constraint mind set. Soft budget constraint is defined as "firms are bailed out persistently by state agencies when revenues do not cover costs" (Kornai 1998, p. 12). Soft budgets are defined as "the expectation of the decision- maker as to whether the firm will receive help in time of trouble . . . " (Kornai 1998, p. 14). MEBO were defined as insider transactions plagued by a lack of capital and technology and constrained by behavioural and cultural issues deriving from their previous existence, buoyed by soft budgets and monopolistic advantage. Vouchers or mass privatisation involved the award of vouchers (share certificates) to the population at large leading to a dispersed shareholding and the problem of asymmetric information between managers and shareholders. These firms inherited debt without the guarantee of state support, resulting in financial difficulties for the nascent banking industry saddled with non-performing loans. In turn this led to credit constraints for the de novo small and medium enterprises established as a result of the formation of market economies. In total, eight states used direct sale as their primary process and a further ten as their secondary. Nine states used vouchers as primary with a further eleven as secondary. MEBO was used by eleven states as their primary and six as their secondary process (Gabrisch and Hölscher 2006; Gabrisch 2015).

The majority of transitional economies quickly liberalised their trading policies which, allied to the break-up of monopolies and the creation of a competitive market, led to improvements in productivity. Subsequently this led to a reduction in the influence of soft budget constraints, which forced firms to either become more efficient or exit the market. This process included the dismantling of the large monopolies into separate entities and allowed the entry of de novo firms (Djankov and Hoekman 2000; Lizal et al 2001). The economic impact of privatisation is significant on firms outside the

Commonwealth of Independent States with Central and Eastern Europe showing the greatest benefit. From a performance perspective, worker and state ownership show the least gains; the greatest being seen amongst investment funds and foreigners and where ownership is more concentrated. The former Soviet Union was particularly adversely affected with the disintegration of its internal market, allied to the introduction of imported competition into the newly independent states (Djankovic and Murrell 2002; Djankov and Freund 2002; Bennet et al. 2004; Estrin et al. 2009).

Privatisation was a key plank of the transition from command to a market economy, although there is evidence that the form of privatisation was also important. Different outcomes were experienced, not only between the NMS and the CIS, but also between states within both regions. This would suggest that the quality of privatisation may have influenced the outcome, with the superiority of outcome being particularly noticeable between foreign and domestic buyers (Brown et al. 2006).

2.7 Exports

The characteristics of exporting firms suggest they are more productive, capital intensive, larger in size, and employ more people and at higher wage levels than non-exporters (Bernard and Jensen 1999). This begs the question whether there is a causal effect of exporting or whether firms self-select as exporters as a result of performance and asset-based characteristics. In the case of Sweden, Greenaway et al. (2005) find that there may not be an exporter productivity premium suggesting that this may be the result of a significant exposure to international trade. This may indicate the more international the state, the more productivity convergence between exporters and non-exporters should be expected. The focus on exporting in relation to productivity and profitability is the emphasis on the superior performance of exporters. Associated with firm growth and survival, this is particularly important in the context of institutional support for smaller de novo exporting firms (Ter Wengel and Rodriguez 2006; Sapienza et al. 2006; LiPuma et al. 2013). The Melitz (2003) predictive model suggests that the most productive firms do self-select into exporting and this is supported by an empirical literature survey (Wagner (2007, 2012). However, only a small group of companies export while the majority concentrate on domestic markets.

The countries of Central Eastern Europe demonstrated that labour force productivity, together with research and development, firm size, foreign ownership and the stock of human capital, were significant determinants of the propensity to export. In relation to exporting, the emphasis on firm size indicates the importance of economies of scale. The exposure of exporters to international markets, technological advancement and experienced professional management reinforces their productive superiority (EFIGE 2011, LiPuma et al. 2013; Cieślik et al. 2014). However, this exposure implies that some benefit accrues to the exporting firm and that there is a learning process. Evidence suggests that learning by doing (exporting) is most apparent in de novo firms and those furthest away from the production frontier. More established and experienced firms, with prolonged exposure to the potential spillover benefits, demonstrate a less observable effect (Bernard and Jensen 1999; Girma et al 2004; Greenaway and Kneller 2007).

To a certain degree, the learning effect depends on the quality of human capital. There is evidence that as far as the transition economies of Eastern Europe are concerned, higher levels of productivity equate to the proportion of graduates in employment and investment in research and development. Additionally, the propensity to export is stronger in foreign owned firms, which tend to be larger in size (Cieślik et al. 2014). These findings demonstrate the importance of absorptive capacity to productivity. Kneller (2005) finds that there is a relationship between domestic firms and foreign frontier technology dependent on the quality of absorptive capacity but decreasing with distance between the technological source and host country. This finding has particular relevance to the NMS due to the proximity of the investing countries, which implies that distance is not an issue in relation to the benefits of the frontier technology of foreign investors. A survey of 54 micro-econometric studies in 34 countries, published between 1995 and 2006, shows that exporting firms are more productive than non-exporters (Fryges and Wagner, 2008). Thus, it is important to establish a link between exports, EU membership and productivity.

2.7.1 Exports: International Production Networks

The relevance of foreign sourced technology has to be viewed in the light of the fact that a significant percentage of FDI was invested in privatisation, which in turn became a platform for membership of international production networks (Hunya 1997). These

production networks consist of the core of the process, namely, the assembler of the finished goods and supplier to the consumer, and those supplying raw material components and services, arranged in a complex tier supply chain. In relation to the NMS, the core companies invested in privatised entities and, later in the process, in greenfield sites to benefit from the comparative advantage of cheap labour. Tier 1 and tier 2 suppliers were encouraged to invest in local companies to minimise distance and maintain the integrity of the just-in-time principle. Nevertheless, a significant quantity of inputs is imported (Djankov and Hoekman 2000; Meyer 2000), implying that the potential for domestic firm spillovers is limited to those in receipt of foreign investment and that the significant content of foreign inputs limits the opportunity for an export multiplier.

The evidence for spillovers to domestic firms within the transitional economies of Eastern Europe is contradictory. Gorg and Greenaway (2004) find a paucity of empirical evidence to support the principle that FDI brings positive benefits, which conforms with Stančík (2007) who found a negative effect of FDI in the Czech Republic, particularly in the upstream sectors. Javorik (2004) found evidence of upstream spillovers, but primarily when domestic suppliers to multinational enterprises have an element of foreign investment. There is evidence that European automotive manufacturers encouraged their tier 1 and 2 suppliers to seek joint ventures in host countries to ensure a robust supply chain (Humphrey and Memedovic 2003). Gorodnichenko et al. (2007) came to a similar conclusion, also finding little evidence of horizontal spillovers except for older, larger firms in the service sector, where the transparency of managerial know how and the necessity to share intellectual property made the process simpler. Findings that domestic firms with foreign investment are the more likely beneficiaries of spillovers, and the paucity of evidence that wholly owned foreign firms share any appreciable level of technology, are constant refrains in literature (Damijan et al. 2003; Havranek and Iesova 2011)

The importance of absorptive capacity in the spillover process is emphasised by Kneller (2005) and Girma (2005), both of whom find that the benefits obtained are influenced by the human resources available. The former finds that the shorter the distance between investor and investee the greater the effect, whilst the latter claims that a base level of absorptive capacity is required for a positive result. In relation to

distance, there is evidence from Mexico that FDI from South Korea and Germany has a positive spillover effect, whereas investment from the United States of America is negative. Whilst this appears to contradict Kneller (2005), the nature of United States investment has to be recognised as primarily into assembly mAcquisladoras, with 80% of inputs emanating from the investing country (Palma 2005). It is also true that spillovers are more likely to be positive where competition and the rule of law are strongest (Sabirianova and Terrell 2005b).

The introduction of the NMS to international production networks has its roots in the Washington Consensus programme, originally designed to cure the ills of the import substitution industrialisation (ISI) policy when it failed in Latin America due to the 1973 oil shock and the limitation of market demand. This resulted in a change of emphasis from ISI to export orientated industrialisation and allowed multinational enterprises to seek comparative advantage in low cost countries in the developing world (Gereffi 2014). However, the term global value chain may be a misnomer, since proximity continues to be an important element of the supply chain, and the core element of international production networks is in fact regional and divided into three; namely, Europe, North America and Asia (Baldwin 2012).

The accession of the NMS provided opportunities for EU15 firms to both offshore and outsource production, following the Ricardian and Heckscher Ohlin trade theories by taking advantage of the most abundant factors of production, particularly that of cheaper skilled labour (Marin 2006). Membership has been a significant influence in the inclusion of the new member states into international production networks, with the benefits going beyond comparative advantage to an extension of the national product offerings (Martínez-Zarzoso et al 2011).

This vertical integration trend led to the new trade theory (NTT) hypothesis that the main factor determining international trade is economies of scale and network effects, occurring in key industry sectors. These can be sufficiently significant to outweigh the more traditional theory of comparative advantage. This thesis concentrates primarily on the “new” trade theory, originally espoused by Krugman (1979), in which he developed his general equilibrium model of non-comparative advantage trade, arguing that returns to scale were an important determinant of growing international trade. This has led to research seeking to determine the effect of trade policy and multi-factor

content on productivity, profitability, exports, firm age and size, imports and the effect on local producers.

In relation to spillovers to local producers, there is evidence of downstream advantages, although these mostly occur in domestic firms with foreign investors (Damijan et al. 2003; Javorcik 2004) with some evidence that, because of domestic representation, these firms are more likely to source inputs from indigenous companies (Javorcik and Spatareanu 2008). There is little evidence of spillovers from wholly owned multinational firms who have clearly little incentive to share technology (Javorcik 2004). Where there is a degree of convergence in relation to technology, there is a tendency for the generation of competition effects (Nicolini and Resmini 2010).

There are some discordant voices in relation to spillovers with Stančík (2007) finding that, in the Czech Republic, there was evidence of negative backward and horizontal spillovers from FDI. This implies that domestic firms are having difficulty responding to increased competition from more efficient foreign companies. However, even in this scenario, Stančík (2007) admits that FDI improves infrastructure and institutional development, together with productivity, in foreign invested firms.

A further aspect of international production networks when located in countries where the comparative advantage is cheap labour, is the nature of the export related platforms established to reduce the final product cost base (Pavlínek 2015). The complexity of these networks means that inputs into final assembly come from across the globe, resulting in a degree of difficulty when calculating the export multiplier.

Examples abound where NAFTA has provided the opportunity for US multinationals to set up assembly plants, known as the mAcquisladoras, along their Southern border: these were essentially assembly plants with high imported input content. There were several consequences, the primary one being the collapse of an export multiplier and the absence of forward or backward spillover linkages (Palma 2005). The Chinese are now the world's largest exporter, but value generation is limited by its membership of international production networks and an increasing use of imported inputs resulting in the erosion of value-added content. An example is the Apple iPhone, where a

$194.04 exported product only realises $6.54 of value added for the assembler (Gereffi 2014).

There are striking similarities to the situation in Eastern Europe, particularly where they relate to countries in close geographical proximity. Following accession to the single market and customs union, Hungary, Poland, and the Czech and Slovak Republics have seen significant transfers of manufacturing seeking the comparative advantage of cheap labour, which is particularly true of the automotive industry (Ellingstad 1997; Pavlínek 2016). This leads to "low wage, low or medium skill, low value added manufacturing" (Ellingstad 1997, pp. 9). The attraction of FDI to the host country is the opportunity, through spillovers and a domestic supply chain, to develop a domestic economy by promoting indigenous firms. However, in the build up to accession, the imperative of creating a market economy, allied to the failure of early economic strategies, led to competition amongst states, using an increasing amount of state investment to tempt the global players with appropriate infrastructure and regulations (Cerny 1997; Drahokoupil 2008). This process was assisted by comprador elites, aligning with multinationals, to mould the state into the creation of an exploitative regime to maximise the environment in favour of the foreign actors (Drahokoupil 2009a). This resulted in what was essentially corporate state capture and, in the case of the automotive sector, encouraged the major companies, followed by their EU15 based component suppliers, making it more difficult for purely domestic firms to achieve traction from spillovers, or any other learning process (Phelps 2000, 2008; Sturgeon et al. 2010).

The dominance of multinational companies, together with their foreign suppliers and external control of operation, allied to corporate capture, has resulted in the crowding out of domestically owned firms. Furthermore, the favourable corporate tax regimes, together with the low value added, makes it difficult for states to invest in education, innovation and an industrial strategy to support domestic firms (Pavlínek 2016). Additionally, the repatriation of foreign firm profits, the incentive to maintain wage gaps between the EU15 and the new member states, and a lack of incentive to improve domestic technological development, makes it difficult to achieve an export multiplier and develop a viable economy based on domestically owned firms (Pavlínek 2016).

Hypothesis 3. Exporters, particularly foreign owned firms, are more productive and profitable within EU.

2.8 Loans

Whilst this study is not confined to research on SMEs, they represent over 80% of the sample. Loan accessibility is an important element of SME development. It forms an intrinsic part of the economy and contributes significantly to economic growth. Access to finance is essential to fund investment, ensure businesses reach their full growth potential and facilitate new business start-ups (EBRD, 2016). A study by the World Bank (2014) revealed that, in emerging markets, more than 50% of SMEs are credit constrained, 70% do not use external financing from formal financial institutions and, of the 30% receiving credit, 15% are underfinanced from formal sources (Hölscher et al. 2016).

Access to finance by SMEs has long been problematical. Debate has focussed on whether the existence of information asymmetries creates circumstances of credit shortages or credit gluts (EBRD, 2016). According to Stiglitz and Weiss (1981), information asymmetries, considered under a basic theoretical analysis of conditions of imperfect information, suggest the existence of credit gaps and that there will be insufficient credit available for all but 'bankable' propositions. They argued that the problem of adverse selection and finance rationing can also occur when banks require collateral.

Their most important conclusion being that information asymmetry, in the form of adverse selection and moral hazard, is the source of market inefficiency in developing countries, leading to low risk borrowers such as SMEs, being side- lined or even excluded from the stream of potential lenders (Stiglitz and Weiss, 1981).

In this study, the basis of the analysis of loans on firm level performance is contained in Levine's (2005) review of the theoretical and empirical literature on finance and growth. Levine identifies five main ways by which, in theory, finance contributes to economic growth: the availability of savings, investment information, the management of risk, the existence of a due diligence process and the facilitation of trade in economic commodities and services. Such considerations provide good reason to suggest that finance has an important role to play in development. However, as Levine (2005)

argues, they do not constitute a rationale for the preference of banks over other forms of finance.

Although some authors argue in favour of a bank based system over equity (see Stiglitz, 1985), the reason for the emphasis on loan financing is rooted in Estrin and Uvalic's (2016) hypothesis that the paucity of FDI into the Balkans may mitigate against an equity based system. They conclude that even when there is FDI, there is little evidence of spillover effects, and suggest that this is "explained by various factors – institutional, economic, and political – that have constrained FDI effects in the Western Balkan economies in comparison to the Central East European countries" (Estrin and Uvalic, 2016; p.1).

According to Levine (2005), the dominant form of empirical research has been a cross-country study linking economic growth to a measure of financial development. The potential importance of firm-level studies to resolve a number of issues, including better detailed information, causality and firm heterogeneity, have long been acknowledged in literature. Nonetheless, there are few firm-level studies on the effects of finance on productivity and other aspects of firm performance (Hölscher, et al., 2015).

A recent study by Levine and Warusawitharana (2014) makes a significant contribution, in part, by enhancing the theoretical foundations for the link between finance and productivity growth.

They find that financial frictions affect both investment and output per worker. Using firm-level data, Berman and Héricourt (2010) found that productive efficiency, when allied to access to finance, increased the propensity to export. Using Italian firm level data, Minetti and Zhu (2011) found that firms facing credit constraints exhibited a weaker export performance. This poses the question whether exports promote greater productivity, or whether more productive firms are more likely to export.

In relation to the transitional economies, Djalilov and Hölscher (2016) found evidence that the early transition economies, namely the new member states, had greater credit availability from banks and the financial sector than the states of the old Soviet Union. Furthermore, they had lower loan loss provisions and less reliance on equity, indicating a level of greater efficiency and strength in depth within the banking sector.

Hypothesis 4. Firms in receipt of loans are more productive and profitable.

2.9 Innovation

The endogenous and new growth theories expound the virtues of the development of innovation as a pre cursor to long run economic performance. Work by Romer (1990) and Grossman and Helpman (1990) contributed to the relevance of research and development to economic growth. There is a recognised technological divide between Eastern and Western Europe and this gap extends to countries within Eastern Europe, with a recognition that there is heterogeneity between countries with a diverse range of inputs (research and development) and outputs (patents, technology) (Krammer 2009). Investment in R&D is influenced by economic openness, protection of intellectual property, government expenditure and the presence of robust research institutions (Varsakelis 2001; Bebczuck 2002). Accession to the EU delivered these attributes to the NMS, providing them with an opportunity to innovate and the confidence that patent protection would provide security for their investment. However, there are certain requirements described by Furman et al. (2002) as the "concept of national innovative capacity" (pp 930). Essentially it established the need, not only for R&D, but also for technology diffusion, absorptive capacity and market demand.

Kneller (2005), found that domestic firms, adopting foreign country frontier technology, were dependent on the absorptive capacity of the host country to achieve productivity gains. Radosevic (2002) found a relationship between each of the components of national innovative capacity (NIC) and that the demand component contained both Keynesian and monetarist components, suggesting that a supply and demand curve in equilibrium is an important ingredient in the promotion of innovation.

Hypothesis 5. Innovative firms are more productive and profitable.

2.10 Services

Literature reviewed to this point in this chapter focusses on the manufacturing sector as there is a paucity of studies specifically covering the services sector. However, since a significant element of this thesis covers services, it is appropriate to provide an insight into the findings of scholars into a sector that was virtually non-existent in the command economies of Eastern Europe.

Within the command economies of the transition countries of Eastern European and Central Asia, the service sector was underdeveloped and not regarded as part of the means of production. This neglect was reflected in poor infrastructure, telecommunications failure and poor financial intermediation, together with the complete absence of support for a market economy such as marketing, advertising and sales (Bolton et al. 1992; Eschenbach and Hoekman 2006). Therefore, the transition from a command to a market economy demanded a developed service sector to support manufacturing and provide for the newly burgeoning consumer market.

This required the construction and liberalisation of the sector and led to the establishment of de novo firms bringing with them greater variety, higher quality product and lower prices in a competitive environment (Arnold et al 2011; Fernandes and Paunov 2012). This new and expanding market inevitably attracted foreign investors; services FDI accounted for 62% of the total foreign investment in the CEE states (Eschenbach and Hoekman 2006).

The presence of foreign owners and investors brought benefits in the shape of management expertise and new technology, with the know how to support a market economy (Hoekman and Mattoo 2008). This resulted in several improvements to infrastructure and telecommunications, but where domestic providers met foreign competition, they either significantly increased their productivity, or exited the market (Eschenbach and Hoekman 2006).

Empirical studies also reported positive impacts on the productivity of manufacturing firms. The increasing presence of MNEs and the introduction of IPNs created opportunities for the provision of services that had previously been outsourced. The expansion of these networks led to productivity gains across all sectors, which were particularly evident in manufacturing (Nicoletti and Scarpetta 2003; Fernandes 2009; Forlani 2010). Evidence also exists that services FDI promotes productivity improvements in domestic firms (Damijan et al. 2015).

There is additional evidence that liberalisation of services also impacted exports. The development of the sector, aided by technology improvements and the geographical proximity to the EU15, provided the NMS with opportunities to compete for

outsourced work with China and India; now amongst the largest exporters to the community (Kandilov and Grenne 2010).

The transition to a market economy has seen the development of a service sector across a range of business categories, particularly construction, communication, insurance, financial and computer services. There is evidence that the NMS benefit from improvement to the institutional environment and the geographical proximity to the EU (Fernandes 2009).

2.11 Institutions

Following the collapse of the Soviet Union and its dissolution on the 26 December 1991 and the assumption, as a stylised fact, that capitalism had triumphed over socialism, the transition began of the 28 states of the former Soviet Union and its satellite states of Central and Eastern Europe from a command to a market economy. The premise was that these states would accept the one size fits all prescription enshrined in the Washington Consensus, regardless of any cultural, societal or institutional factors that might demand an alternative approach (Lavigne 2000). Countries were encouraged to adopt the basic tenets of the programme; namely, privatisation of state owned enterprises, relaxation of price controls, market liberalisation and a freeing up of capital controls.

This was to be undertaken in an environment in which government institutions were geared to a command economy and led by a dictatorial state with societies that had become accustomed to price controls and full employment in state monopolies (Gabrisch and Hölscher 2006). The results were mixed. Some states became democracies, others remained dictatorships, and the Balkans descended into bloody conflict.

In economic terms, the effect of transition was varied. Fast track privatisation on the back of weak institutions resulted in recession and increased unemployment, summed up by Djankov et al. 2003 as a journey from dictatorship to disorder. The transition journey is inevitably conditioned by the starting point of the initial economic and institutional climate, with economic liberalisation being the main determinant of growth and political reform being the important influence on its speed of development (de Melo et al. 2001). The increasing inequality of the developed world is well

documented, but in his seminal work Milanovic 1998, found that inequality increased during transition and it was wage differentiation that drove this general trend with other private income having little effect. The position was exacerbated by a fall in output, which increased inequality. In general, transition reforms increased inequality and were largely pro rich and anti-poor, particularly when reforms were not accompanied by the development of a financial market and competition policy (Aristei and Perugini 2012, Milanovic and Ersado 2011). Additionally, a hollowing out of the state sector, as a result of privatisation, appears also to have increased inequality, with two strands of movement, either into the privatised sector or into unemployment (Milanovic 1999).

In 2005, the Central European countries demonstrated that, in relation to economic governance and institutional development, they were in the vanguard ahead of both the South Eastern European nations and the Commonwealth of Independent States. The latter still experience constraints due to corruption and their institutional development lags behind Central Europe. However, supported by high oil prices, countries outside the EU showed GDP growth of 8.6%, with 6.6% being achieved by the NMS. The region overall was experiencing strong domestic demand fuelled by the increasing availability of domestic credit, however, as a result, some countries began to experience capacity constraints as demand exceeded supply (EBRD 2005).

The impact of the 2008 financial crisis and the Eurozone crisis had a significant impact both on economic growth and institutional reform, particularly in the NMS. By 2013, growth had slowed to 1.3%, whereas other transition economies outside the EU had managed a reasonably healthy 4.2% (World Bank 2005 and 2013) indicating that the crises had a greater effect on the EU than elsewhere in Eastern Europe and Central Asia. In addition to the slowdown in growth, structural reforms both slowed and, in some instances, stagnated. There is evidence of increasing government interference in various market sectors, particularly the energy sector, resulting in some negative economic trends within Central and Eastern Europe. Despite some positive developments relating to infrastructure improvements, the EBRD's title page "Stuck in Transition" sums up the issues raised in the 2013 report (EBRD 2013).

Shortly after the first wave of accession of the NMS, economic reform began to stagnate. The only exception was the Western Balkans, which continued to receive EU

support because of its state building programme. The CIS failure to develop strong political institutions to support economic reform had retarded progress. In the NMS, the financial and Eurozone crises had elicited a negative attitude toward continued market focussed reforms, with a marked deterioration in enthusiasm for any further progression. This has resulted in a position in which output per worker is projected to be weaker over the next decade and the objective of convergence becoming a distant dream (EBRD 2013). The EU model of integrated markets and adherence to the *Acquis Communautaire* has come under pressure. The failure of capital flows after the financial crises, FDI in the case of Central Europe and bank credit in the case of the Baltics and the Balkans, have led to a deterioration in current account positions and in some cases, serious debt overhangs. The Lisbon Treaty of 2000, designed to deal with stagnation of economic growth in the EU, failed to make provision for the NMS prior to their accession.

This included a lack of appreciation for the dangers of capital misallocation and the implications of massive capital inflows into individual states, together with the impact on foreign currency and the appropriateness of an exchange rate policy. The accusation is that the adoption of a procedure driven approach results in a failure to use structural funds effectively, whilst failing to adopt a greater flexibility towards fiscal policy (Becker et al. 2010; Jacoby 2010; Epstein 2014; Houghton 2014; Medve-Bálint 2014; Innes 2014).

Furthermore, there is evidence that economic reforms, particularly the development of property rights and the stabilisation of growth, price levels and unemployment, were the key drivers which separated the more successful transition economies from the rest; these reforms being more important than institutional development (Lavigne 2000). However, the belief that institutional reform was stagnant has not avoided empirical scrutiny. Hartwell (2013) finds that where economic reform was at its most active, institutional development followed. The premise being that substantial moves towards economic prosperity forced the development of appropriate institutions to meet the needs of a market economy. The contrasting scenario being that a lack of economic development failed to provide any incentive for change, resulting in stagnation. He further found that the antecedent and ideology of the leadership was also a significant factor in the success or failure of transition. A finding that resonates

today in the state capture, by political factions, in Poland, Hungary, Czech Republic, Romania, Bulgaria and Latvia, representing 54% of the NMS (Innes 2014).

The phenomenon of state capture may have its gestation in the process of accession and the perceived economic welfare advantages post accession. The Washington Consensus programme is based on conditionality of support and, because of its internalisation by the EU (Fitoussi and Saraceno 2013), the accession process followed a similar prescription. The grant of membership was dependent on conformity to the Acqui Communitare, acquiescence to a trading regime designed to benefit EU15 competitiveness, and the reduced danger of an enlarged market from the original bloc (Ellison 2006).

The combination of protectionism and the establishment of neoliberal regimes throughout the NMS, exerted pressure on the social democratic reformers attempting a market orientated reform whilst sustaining redistributive programmes to improve national welfare. Due to limited economic growth and the fiscal constraints that ensued, the unsustainability of these programmes provided fertile ground for nationalist parties to appeal to the electorate, and a platform for state capture by illiberal elites motivated by the twin ambitions of power and wealth (Innes 2014).

There is also evidence of corporate state capture in transition economies. This suggests that countries divide into high or low capture economies and into firms that adopt capture as a strategy and those that choose influence. The capture firms tend to be the larger de novo firms with no previous state involvement, whereas firms of influence tend to be state owned, or newly privatised, with current or previous strong connections to government officials and institutions (Hellman et al.2003). In relation to FDI, it is salutary that there is also evidence of state capture where firms with a domestic shareholding element tend to be capture firms and multi nationals rely on kickbacks (Hellman et al 2000). Both papers find that, in all cases, firms practicing this kind of corruption benefit in terms of profit and growth, particularly in high capture economies, which causes negative externalities to smaller domestic firms. Hellman et al. (2000) also find both the flow and quality of FDI deteriorates as a result of firm behaviour. Interestingly, state capture firms in the pre-accession states of the EU represent 9.9% of the sample (9.1% amongst others) and 10% of firms of influence (11.4% amongst others) indicating that circa one fifth of firms participate in corrupt

practices, and there is little improvement amongst firms within two years of becoming EU members (Hellman et al. 2000, 2003). Clearly, despite a theoretical compliance with the Acqui Communautaire, there is little difference in levels of corruption. These papers quote BEEPS 2009 survey as their data source. Of interest also is that amongst the EU pre-accession countries, those with low corporate state capture display a high level of political capture, indicating a trade-off between corporate and political power (Innes 2014).

The WC programme is predicated on the claim that the 10 points are a prescription for the achievement of economic growth, promulgating the structural changes required to ensure compliance with the programme. Reference to literature suggests that economic growth relies on structural change. The most obvious example is the transformation from an agricultural to an industrial base, with the accompanying population movement from a rural to an urban environment; the increasing sophistication of the process creating a demand economy and, as it develops, productivity and incomes increase (EBRD 2005, 2013). The relative speed of this process determines a country's position within the global economic hierarchy and is the key factor that differentiates successful countries from unsuccessful ones.

Developing economies are characterized by large productivity gaps between different parts of the economy. Dual economy models, such as W. Arthur Lewis (1954), have typically emphasized productivity differentials between broad sectors of the economy, such as the traditional (rural) and modern (urban) sectors. In many ways, the Lewis model is a departure from the assumptions made in classical trade models, as he addresses the issues of developing economies in the light of their transition from peasant agrarian subsistence to an urban industrial environment, based on the comparative advantage of cheap labour. His theory states that a "capitalist" sector develops by the utilisation of labour from the agrarian "subsistence" sector providing an "unlimited" supply, allowing the capitalist sector to expand for some time without the need to raise wages. This results in higher returns to capital, which allows for capital accumulation. The re-investment of this money leads to an increasing demand for labour, and the process continues until this factor of production is exhausted. At this time, an increase in skill and technology will lead to modernisation and economic development (Lewis 1954). A current example is China, where labour is becoming

less abundant and capital is being used to increase wages, thus fuelling increased demand. It has been described as the Lewisian turning point, when agricultural wages are determined by the constancy of the subsistence level before the turn, and by the marginal productivity of labour afterwards. When the latter increases, wages should demonstrate a change from a constant to an increase, thus demarcating the turning point (Minami and Ma 2010).

More recent research has identified significant differentials within modern, manufacturing activities. Large productivity gaps can exist even among firms and plants within the same industry. Whether between plants or across sectors, these gaps tend to be larger in developing countries than in advanced economies. They are indicative of the allocative inefficiencies that reduce overall labour productivity. The upside of such allocative inefficiencies is that they can potentially be an important engine of growth. When labour and other resources move from less productive to more productive activities, the economy grows, even if there is no productivity growth within sectors. This kind of growth enhancing structural change can be an important contributor to overall economic growth. High-growth countries are typically those that have experienced substantial growth enhancing structural change.

The main difference between the recent growth in Asia and growth in Latin America and Africa, can be explained by the variation in the contribution of structural change to overall labour productivity. The importance of productivity to economic growth has been the subject of significant literature and the availability of production activity data has allowed researchers to discover how inputs are created into outputs and the measurement of the efficiency of that process, namely, productivity (Syverson 2011). However, the overwhelming finding is that countries and firms have differing levels of productivity despite economic, sector or industry compatibilities.

In this context, the performance of firms is an essential element of economic growth. The laboratory, created by the transitional economies of Eastern Europe and Central Asia, with its dichotomy between countries that have become members of the EU against those in the Western Balkans and the Commonwealth of Independent States, provides an opportunity to compare the performance of firms exposed to the full prescription of the Washington Consensus programme, as internalised by the EU, and

those who adopted selective elements of it and applied it piecemeal (Gabrisch and Hölscher 2006).

2.12 Measurement of Firm Performance

This thesis has selected productivity and profitability as the measurement of firm performance. Whilst both are highly correlated there are essential differences which make the measurement of both important.

It is known that more productive firms are more likely to survive than their less productive peer group. This implies a selection process but this is predicated, primarily, on profit and not productivity (Foster et al. 2008). The theories behind the importance of productivity result from the proposition that more efficient firms are able to improve price cost margins and thus take market share from the poorer performers who then exit the market. This drives up the productivity of the surviving cohort (Melitz 2003; Asplund and Nocke 2006). However, in terms of firm performance, profitability is important because it reflects demand shifts, price cost margins and factor pricing. It also reflects firm positions in the market place where some firms enjoy market power, whereas de novo firms are more likely to charge lower prices. It is therefore prudent to observe, where possible, both performance measures (Tybout 2003; Gorodnichenko 2005; Foster et al. 2008).

2.12.1 Productivity and Profitability

"Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker" (Krugman 1994 pp11). The use of output per worker as a measure of productivity follows other papers using BEEPS data and log of sales, divided by total employees, for measurement purposes (D'Souza et al 2017, Pfeifer 2015, Waldkirch 2014, Dutz and O'Conell 2013, Gorodnichenko and Schnitzer 2013, Ricci and Trionfetti 2012). Hence, the choice of this measurement as the primary measurement of firm efficiency and its feature in all four empirical chapters. The second measure, profitability, is utilised in only the fifth chapter primarily as a robustness check, but also because of the distinct difference between productive efficiency and factors relating to competition, market power, pricing strategies and the tendency for de novo firms to reduce prices to gain market traction (Foster et al. 2005).

For example, Coad et al. 2013 find that age has a positive effect on productivity but a negative effect on profitability.

Economics tends to dictate that firms are profit maximisers, however, despite some making super normal profits, the majority achieve only competitive rates of return. A number of theories claim to determine causation in relation to profitability. These range from market structure and the degree of concentration (number of firms, size distribution and industry behaviour), to the degree of market power and/or share. This is allied to the influence of technological factors such as economies of scale, extent of innovation and marketing expenditure (Slade 2004). In a competitive market, the Bertrand model claims that firms will set prices at equilibrium, which will be above the marginal cost, but this assumes that firms have the same cost base. Thus, any additional market or product enhancing actions taken, could determine the advantage. The Cournot model however, states that a firm's price/cost margin will be directly proportional to market share and that, as a consequence, firms within the same industry sector will create a condition where any index of price/cost margins are directly proportional to the Hirschman Herfidahl index (HHI) of industry concentration (Cowling and Waterston 1976). With their game theory connotations, both models emphasise the importance of price in relation to market selection, although price setting results from both exogenous and endogenous factors. The most productive firms grow and increase market share, whereas inefficient firms shrink and possibly exit the market. Thus, larger firms come to dominate the market and concentration results in a greater level of profitability. Janovic (1982) claims that this is the result of an efficiently evolving market and not the concentration of market power, although the distinction would appear to be rather obtuse.

The structure of the market in which the firm operates will be the most important determinant of its profits. Firms with large market shares will be more profitable, with those bearing greater systematic risk earning higher rates of return (Halmai and Vásáry 2010). If these are MNEs, there may be distortions in relation to transfer pricing, currency exchange and a reliance on labour as the only value added in the mix (Borocz 2012). Input price variation is another possible business-specific influence on profitability that could appear in productivity measures. Businesses enjoying idiosyncratically low input prices will appear to be hiring fewer inputs per unit output

(Katayama et al. 2003; Gorodnichenko 2005). Profit per worker is defined as sales minus total cost, divided by full time employees or their equivalents, and used as a robustness check. There are limitations to the data when measuring profitability which restricts the results to gross margin. Whilst productivity and profit are highly correlated, there is potentially a disconnect between productive efficiency and profitability, reflecting either am idiosyncratic demand shift, the influence of market power as opposed to production efficiencies, or the use of technology (Foster et al. 2005). It is therefore appropriate to measure separately this aspect of firm performance.

The distinction between productivity and profitability is important. A significant body of literature points to the relationship between productivity and firm survival with the more productive firms becoming larger and having a greater propensity to survive (Bartelsman and Doms 2000). However, Foster et al. (2008) have a more sanguine approach and argue that "productivity is only one of several possible idiosyncratic factors that determine profits, however other idiosyncratic factors may affect survival as well" (pp 395).

Literature on productivity is significant and varied, focussing on single specific relationships such as FDI, exports, innovation, institutional development and human capital (Syverson 2011). There is little that covers a multiplicity of these variables while attempting to establish whether there is a relationship between them in totality and the performance of firms. This study attempts to establish the performance of firms within countries that have, through accession, adopted the Washington Consensus programme, as internalised by the EU, and whether, as a result of membership, they gain additional traction from the other determinants.

Significant heterogeneity exists between firms, even in the same industry sector. Syverson (2004) found that in the US manufacturing sector, a firm in the 90th percentile would manufacture twice as much output for the same level of inputs as one in the 10th percentile. A finding, endorsed by Bartelsman and Doms (2000), concluded that human capital, technology and managerial competence were amongst the variables likely to have a causal relationship with firm heterogeneity and productivity. Amiti and Konings (2007) found that this heterogeneity spans producers in every sector, with firm entry, growth and failure generating large flows in

employment without disturbing the equilibrium. Additionally, firm entry and exit have a role with low productivity companies more likely to fail, and firm characteristics of age, size, propensity to export, labour costs and technical competence being important influences (Bernard and Jensen 1999; Foster et al. 2001). Technology is a particularly important factor as the adoption of advanced technology is directly related to highly productive firms (Doms et al. 1997).

Other more general influences which enhance productivity outcomes include the influence of tariffs on imported inputs, suggesting that a reduction in tariffs results in productivity improvements. Evidence from Indonesia indicates that a 10% fall in tariffs resulted in a 12% increase in firm productivity levels (Amiti and Konings (2007). This result is supported by Bernard et al. (2006) who found that, as trade costs fell, the productivity of those performing at the higher end of the distribution curve attracted greater economic activity. This gain is at the expense of firms at the lower end of the curve that either shrink or exit. Imported inputs have an additional effect on productivity as they provide access to technology at the cutting edge of the production frontier. This implies that the international diffusion of knowledge and technology is an important source of productivity spillovers in developing economies (Wagner 2012). This finding is endorsed by Crespi et al. (2008) who claim that competitors, suppliers, universities and multi nationals are the main source of spillovers, with those that are vertically integrated, gaining the most.

2.13 The Western Balkans

Within the overall process of economic transition there is a subset of states providing additional insight into the influence of the EU on both the NMS and non-member states. It is claimed that the expansion of the EU from 15 to 28 states in the period 2004–2013, led to significant economic and geopolitical benefits for the Balkan states of Bulgaria, Croatia, and Slovenia. The Acqui Communautaire has guaranteed the development of bureaucratic institutions within the NMS, although this process is also evident in those countries of the Western Balkans in accession. This is more prominent in Serbia, Montenegro and Macedonia than Albania, Bosnia and Herzegovina and Kosovo (Petrovic and Smith, 2013).

There is evidence however, that an element of enlargement fatigue is now emerging in the deliberations of the EU in relation to the accession of Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro, and Serbia. The ethnic wars of the early nineties caused hardship and significant disruption to societal and institutional development and these issues remain extant and must be addressed before accession can be considered (Vachudova 2014).

"Since the early 2000s, the EU has emerged as the primary participant in state building in the Western Balkans. Based on a dual strategy of state building and European integration, the EU has sought to replace other international organisations in the post-conflict reconstruction of the Western Balkans" (Bieber 2011, p.1783). Nevertheless, the EU claims to be committed to closing the productivity and technology gaps between the transition countries of Eastern Europe and is an important element of the need to achieve economic convergence and European cohesion.

Evidence exists that the Western Balkans are increasing their participation in international production networks (IPN), where fragmentation of the manufacturing process has created an interwoven network of inter industry trade flows across countries, involving the transition of intermediate goods across borders until a final assembly destination is reached (Shimbov et al., 2016). It would therefore be prudent to evaluate the success of those Balkan countries which are members, against those which are not. The six Western Balkan states moving towards accession may be reluctant to embrace neoliberal values, in addition to the possible "fatigue effect" of the EU's Eastern expansion programme (Noutcheva, 2006; Bieber, 2011). At the macroeconomic level, convergence between the EU 15 and the Balkan countries appears to be occurring at a slow pace, which might indicate that some key determinants are not in place (Botric, 2013). Bieber (2011) suggests that the problem arises from the conflicting demand of the technocratic accession process and state building responsibilities, focussed on conflict management. Conflicting views in literature relate to the advantages of EU accession (Bezel, 2011) and this thesis intends to determine whether, at firm level, such benefits exist.

Since Slovenia and a further seven Eastern European transitional economies acceded to the EU in 2004, followed by Bulgaria and Romania in 2007 and Croatia in 2013, the question has arisen whether the countries of the Western Balkans could be

integrated more promptly. Barriers to membership remain within the Balkan five (Albania, Bosnia Herzegovina, Kosovo, Montenegro and Serbia) and whilst this paper is not focussed specifically on FDI, there is empirical evidence that a negative attitude towards investing in the Balkans can be alleviated, to some degree, by EU membership (Estrin and Uvalic, 2016).

Other factors include the size of the economies and distance from investment hubs, but principally the paucity of institutional processes. There is 'a negative "Western Balkans" effect' on FDI (Estrin and Uvalic, 2016, p.5) resulting in the need for firms to find alternative sources of finance either from an internal capital market or in the form of loans. EU member countries have proved a more attractive FDI destination than the Western Balkan states, evidenced by a negative effect in this region. This is possibly as a result of the lack of institutional reform and the establishment of strong structural controls (see Krugman, 1979; Epifani, 2003; Estrin et al., 2009; Gustafsson and Segerstrom, 2011; Estrin and Uvalic, 2016; Okafor and Webster, 2015). The Western Balkans were, however, the recipients of substantial capital inflows prior to the financial crisis of 2008, although subjected to significant outflows thereafter (Gabrisch et al. 2016), and it is plausible to suggest that different investor priorities rather than a negative attitude to the Balkans may be an alternative rationale.

In the Balkan region, the number of firms experiencing credit constraints vary from Bosnia and Herzegovina 25% to Montenegro 67%, with EU member firms faring no better than non-EU; a position which has deteriorated since the financial crisis (EBRD, 2016). Literature suggests that the predominance of foreign banks with enhanced credit scoring criteria, allied to the necessity to improve capital ratios at home, may be contributory factors, together with the underdevelopment of capital markets (Caviglia et al., 2002; Thimann, 2002; Volz, 2010; Estrin and Uvalic, 2016). The EBRD 2016 believes that progress in the Balkans is being retarded as a result of financial imbalances, credit constraint and a lack of FDI (see also Estrin and Uvalic, 2016). The misallocation of capital may be an additional constraint (Gopinath et al., 2015). The influence of capital accumulation is critical, since it will improve both labour productivity and reduce the technology gap (Filippetti and Peyrache, 2013). It is therefore important to control for capital in relation to the measurement of productivity and, since BEEPs allows for the disaggregation of capital into balance sheet,

replacement and rental (leasing), it enables an analysis of the significance of each of these variables on the outcome.

As a driver of productivity, the EBRD Transition Report for 2014 focussed on innovation, but recognised that capital intensity (capital per worker), proximity to the main business centre (infrastructure), skilled labour, competition and foreign ownership are also important determinants. Additionally, firms trading nationally or internationally are more productive than firms primarily targeting local markets (EBRD, 2014). It is assumed the greater the skill-base the more productive the firm and evidence suggests the greater the proportion of highly skilled workers, the more positive the result for labour productivity and profit. This implies that firms with lower levels of skill base are underinvesting in human capital (Covers, 1997) and evidence suggests that, where there is a high degree of ethnic and demographic diversity within the work force, there is a negative effect on productivity (Parrotta et al., 2012); an interesting finding in relation to the labour force composition of the Balkan states.

Employment rates in the Balkan region are problematical, with new EU member states at 64% and non-EU member states 46%. Evaluating these figures, one might anticipate cost per worker to suffer some downward pressure, however, a combination of labour market rigidities, incomplete reform programmes, a strong social welfare net and migration of skilled workers, have raised wages in relation to productivity, particularly in non-EU member states (Kovtun et al., 2014). In relation to skilled workers, there is evidence that Balkan industry lacks skill due to a mismatch between demand and supply, exacerbated by the educational failings of individual states (Bartlett, 2013).

The dependant variable, productivity, (measured as output per worker), is analysed in relation to EU membership and receipt of loans, whose relationship as factors of production, is predicated on evidence that misallocation of capital, following the adoption of the euro and a reduction in interest rates, led to a reduction in productivity in Southern Europe (Gopinath et al., 2015). There is also evidence that, following the accession of new member states, credit constraint was responsible for the lack of productivity improvements in relation to the more established members of the EU. It is suggested that funds flow to firms with higher net worth who are more prepared to risk investing in a climate of uncertainty.

However, their balance sheet status does not automatically imply that they are amongst the most productive (Gopinath et al., 2015; EBRD 2013). There is little evidence of exploration of the relationship between the level of productivity, accession to the EU or access to finance, although work done suggests a reduction in productivity due to misallocation and credit constraint.

2.14 The Research Gap

It can be argued that the pre-accession protocol of the EU was a more complete and gradual implementation of what was essentially an augmented Washington Consensus programme, which has led to a better outcome than the shock therapy of mass privatisation and price and trade liberalisation, without the concomitant development of an institutional base (Kolodko 1999; Babb 2013). Fischer and Sahay (2000) divided the transitional economies of Eastern Europe and Central Asia into Central and Eastern Europe, the Baltics and the countries of the former Soviet Union. They concluded that the first two experienced more successful transitions than countries of the former Soviet Union. As eleven countries of Eastern Europe and Central Asia became members of the EU, the opportunity is available to compare and contrast performance, at firm level, against a measurement of productivity and profit, together with the identification of the key determinants which influence the pursuit of improvement in these areas.

It is clear that work on productivity is at times contradictory, with arguments both for and against the influence of FDI and trade liberalisation, particularly on domestic firm productivity. Essentially, views reflect the examination of single countries (Pavenik 2002, Amiti and Konings 2007 Topalova & Khandelwal 2011) who generally find significant evidence of productivity improvements, and those who carry out cross country regressions where the results are less conclusive, some researchers finding that trade liberalisation has little or possibly a negative impact on country productivity (McMillan and Rodrik 2014, Freeman 2003).

Significant literature on the subject appears to indicate heterogeneity between industries and firms within sectors, with a number finding little spillover to domestic firms from the presence of foreign firms or capital.

Productivity seems to be driven by the presence of foreign firms with superior technology and management, allied to the exit of less productive domestic firms. Furthermore, within industries, there are significant differences in the productivity gains achieved at firm level (Greenaway & Kneller 2007).

Therefore, the outcome variable productivity, measured as output per worker, has been selected as a measure of firm level performance due to its importance to economic growth. The harnessing of the productive inputs of capital, labour and technology are at the heart of a successful economy. A comprehensive review of literature suggests that whilst managers have significant control over the endogenous determinants of production, they can do little about exogenous influences (Syverson, 2011). Whilst literature does exist on the subject, the majority deals with the specific issues grounded in theory. Little examines the relative performance of firms subjected to geopolitical economic shocks, the materiality of funds flow and the influence of key determinants of firms' performance.

This thesis provides an insight into the influence of the key elements of the WC programme on firm level performance, measured as productivity and profitability. There is little evidence that a comprehensive analysis involving research exploring the holistic relationship of key determinants on firm level performance, has been attempted before.

Overwhelmingly, literature concentrates on work at the macro- economic level, with a leavening of qualitative research based either on non-empirical data, or econometric modelling based on simulations (Veneroso & Wade (1998), Beeson & Islam 2005 on the South East Asia crisis. Pavenik (2002), Franko (2007), Grugel et al (2008), Grugel & Riggirozzi (2012) and Peluffo (2014) for South America. Gabrisch & Hölscher (2006), Ban & Blythe (2014) for Eastern Europe and Estevadeordal & Taylor (2013) for simulations. Equally, there is a significant body of literature relating to specific countries and particular elements of the WC such as privatisation, FDI and trade liberalisation (Amiti & Konings (2007), Estrin et al (2009) Wagner (2012), Estrin & Uvalic (2016) and Waldkirch (2014). However, little exists that examines the effect of trade liberalisation at firm level, applying empirical data to analyse comprehensively the relationship between it and firm performance.

The neoliberal paradigm epitomised by the WC, assumes that improvement in business performance will be distributed to all participants in the process. In 2008, Krugman outlined his hypothesis that international trade was a key determinant in relation to wage reduction and income inequality, refuting the belief that it was technologically driven. He claimed that the vertical integration of global supply chains resulted in the maintenance of the comparative advantage of cheap labour in the economy of developing countries. (Krugman 2008). Whilst his major focus was on trade between the US and China, this resonates with the economies of Eastern Europe in the transition between a command and market economy.

Evidence exists in both the developing and developed world that an increase in skill premium increases inequality between skilled and unskilled workers; the more educated achieving the greatest benefit (Goldberg and Pavcnik 2007, Acemoglu 2003). Trade liberalisation and FDI introduce capital, technology and intellectual property and therefore increase the demand for skilled labour. Simultaneously, competition is introduced causing an exit of the most unproductive domestic firms and a reduction in rents, putting pressure on the most factor abundant element, namely, unskilled labour (Arbache et al 2004).

There is significant critical analysis of the WC, particularly in relation to income distribution and the alleviation of poverty. However, the approach is essentially macroeconomic, albeit based on empirical data and econometric methodology. The main findings show a duality in the labour market, with temporary and self-employed workers earning less than permanent employees who are more experienced, educated and skilled. The WC therefore proves expensive in terms of social cost (Hölscher et al 2011, Hölscher 2009). In part, FDI flows appear to be driven by lower labour costs. Labour productivity is an important determinant, resulting in policy actions to deregulate labour markets (Bellack et al 2008). This finding is confirmed by econometric analysis, which indicates the importance of labour market institutions over time, with deregulation improving performance and active labour market policies reducing unemployment (Lehman & Muravyev 2012). When competition and financial markets are underdeveloped, there is an increase in income inequality (Aristei & Perugini 2012).

Evidence indicates that strong policy makers are as essential as the accepted tools of a market economy (Popov 2009). However, the narrative would not be complete without examining the influence of institutional and financial development on the transitional process, and essentially which aspects assist firm outcomes and which retard development. Evidence exists that the strength of trade liberalisation, financial reform and legal development encourages FDI and issues such as corruption, bureaucratic and infrastructure constraints have a negative influence (LiPuma et al. 2013).

It is recognised that the collapse of the Soviet bloc also brought about the failure of institutions built on the strong bureaucratic edifice of a command economy within the political environment of a one party state. The work of establishing a new paradigm is ongoing, particularly outside the NMS, and has posed significant challenges to businesses and entrepreneurs who have struggled with the development process as institutions evolved to obtain legitimacy (Gelbuda et al 2008).

This research will approach the question from the perspective of firms where the actual impact of trade liberalisation, FDI, financial flows and international trade are experienced. It will allow these determinants to be measured against firm level performance across regions with differing experience of the WC programme. Since data can be disaggregated into industry sectors, it will be particularly apposite. The performance of firms can then be measured against the investment and business climate, providing an opportunity to identify financial and institutional constraints and inform policy. The thesis has the advantage of measuring the WC programme against a background of similar economic histories, politics, culture and ideologies and will suppress the noise created by these elements in previous studies.

In the micro economic literature, there is a paucity of comparison of the effect of the WC programme, either in totality or in part, on specific trading groups whose stage in the transition process has already been accurately measured. Data is available to allow the comparison to be analysed over two periods, which will provide, at firm level, a measure of progress towards the transitional goals, with a comparison between the two regions. It will further permit the identification of both the determinants of progress and sluggishness and some insight into the opportunities and threats.

In addressing the research gap and with the use of EU membership as a proxy, the analysis will cover the universal efficacy of the WC programme. Additionally, using two econometric models, it will evaluate other key determinants emanating from the WC programme. It will measure the characteristics of firm age, size and ownership, which is particularly relevant in relation to the importance of the privatisation programme which occurred in the majority of transitional states. The effect of FDI, exporting, loans and innovation will be evaluated, together with the influence of institutions and corruption. The objective being to contribute a holistic assessment of the WC programme across a wide set of parameters and provide a comprehensive view which will be unique in its depth of analysis. It will cover the periods of 2005 and 2013 and track performance across an 8-year period, to provide a measurement of transitional progress, allowing for an assessment of the success or failure of key elements of the WC programme at firm level.

2.15 Conclusion

This research examines the role of the Washington Consensus programme on the development of the transitional economies of Eastern Europe with particular emphasis on the new member states of the European Union. It is predicated on the assumption that the EU has internalised the WC programme which allows it to be a proxy for which can be utilised to examine its efficacy against by comparing the performance of firms within the NMS of the EU against a control group with the same political, cultural and economic background. There is evidence in literature which justifies this claim with both Fitoussi and Saraceno (2013) and Lutz and Kranke (2014) both providing cogent arguments which supports the assumption. Transition literature, particularly Gabrisch and Hölscher (2006), have identified the selective influence of the WC programme across the Eastern Europe and Central Asia with only the NMS implementing it in its entirety.

EU membership has a positive effect on the NMS and specifically on firm performance, albeit it that the effect is more economic than political, with evidence that some Central European states are susceptible to state capture and corrupting influences. In particular FDI which has been a significant influence in the privatisation process. This has resulted in a more competitive environment for domestic firms and has led to the introduction of IPNs into the manufacturing sector. This form of vertical

investment has, in turn, increased exports with evidence that the most productive firms self-select into becoming exporters. There is contradictory evidence in relation to export premia and spillover effects and the latter may have led to the crowding out of domestic firms and little in relation to technological transfers. Actions taken by NMS governments to attract FDI has led to tax breaks and infrastructure expenditure which, exacerbated by profit repatriation, have had a deleterious effect on national welfare.

The availability of capital and loan finance, in an efficient financial intermediation environment, contributes positively to firm performance. However, there is evidence of credit constraint throughout the region with capital availability being most acute in the Western Balkans. Older, larger companies are more productive and profitable and take advantage of their experience, and of economies of scale, network effects and market power. However, the findings in relation to age of firm are somewhat contradictory. Some notable researchers have provided contradictory evidence that de novo firms grow more quickly and are more flexible in their business approach, although they are forced to charge lower prices on market entry. De novo domestic firms outperform privatised companies, which in turn have a superior performance level to state owned entities.

The literature surveyed is rich in information relating to this research. However, there is no evidence that the comprehensive analysis of the WC programme in what might be described as laboratory conditions has been conducted before. The research encapsulates all the individual factors analysed in previous papers and individual countries and brings all the entities together in one document and tests them empirically using treatment models that can provide comparative data. The comprehensive nature of the research will inform the wider debate in relation to the efficacy of the WC programme and produce signposts for future study.

Chapter 3: Data and Variable Description

3.1 Introduction

The data for this thesis is taken from the World Bank, the European Bank for Reconstruction and Development (EBRD) and Transparency International (TI). Four sets of data are utilised namely, the Business Environment and Enterprise Survey (BEEPS) produced by the World Bank and the EBRD, the World Development (WDI), the Worldwide Governance Indicators (WGI) produced by the World Bank and The Corruption Perception Index (CPI) produced by TI. Data is taken from the 2005 and 2013 surveys and, for the same years, from the WDI, WGI and CPI. A list of variables with sources is produced below.

3.2 Background

This thesis evaluates the effect of the Washington Consensus (WC) programme, as internalised by the European Union, on, primarily, the Eastern European countries that became members, with a commentary on the influence of key elements of the programme on those that did not join. A total of 27 states are involved across the wide geographical area from the border of Western Europe to the Pacific Ocean. The scale of the land mass involved is illustrated in Figure 3.1 below.

Figure 3. 1 Map of the Transitional Economies of Eastern Europe and Central Asia identified geographically by Number and Listed in the Index

Source: European Bank of Reconstruction and Development 2005

Index 1

Central Eastern Europe	South Eastern Europe	CIS
01 Czech Republic*	09 Bulgaria**	16 Armenia
02 Estonia*	10 Croatia***	17 Azerbaijan
03 Hungary*	11 Romania**	18 Belarus
04 Latvia*	12 Albania	19 Georgia
05 Lithuania*	13 Bosnia and Herzegovina	20 Kazakhstan
06 Poland*	14 FYR Macedonia	21 Kyrgyz Republic
07 Slovak Republic*	15 Serbia and Montenegro	22 Moldova
08 Slovenia*		23 Russia
		24 Tajikistan
		25 Turkmenistan
		26 Ukraine
		27 Uzbekistan

*EU Accession 2004 **EU Accession 2007 ***EU Accession 2013

The first 11 numbered countries are members of the EU with the balance of South Eastern Europe in the accession process. Countries numbered 16 to 27 are members of the Commonwealth of Independent States, although Ukraine and Turkmenistan never ratified the charter and Georgia withdrew in 2008 following the war with Russia. The organisation cooperates on economic, political and military aspects and coordinates trade, finance, legal matters and security. Turkmenistan (25) is not included in the database due to problems relating to an oppressive political environment rendering the information gathered unreliable (EBRD 2005).

Following the dissolution of the Soviet Union in December 1991 the countries of Eastern Europe and Central Asia began the transitional journey to a Western style capitalist economy. This process has been measured by the European Bank for Reconstruction and Development conveying their findings in a series of transitional reports published at regular intervals since 1998. The research contained in this thesis uses the same data as used for the transition reports of 2005 and 2013, augmented by data from the WDI, WGI and CPI for the same years.

In 2005 progress in relation to political and economic reforms were evident throughout the region, albeit that economic growth had slowed. The business environment improved but de novo firms continued to report considerable obstacles to business. Regionally Central Eastern Europe (CEE), consisting of the new members of the EU, made significant progress in terms of institutional and economic reform resulting from their adoption of the *Acquis Communautaire*, whilst in South Eastern Europe, Bulgaria and Romania, both in the accession process, were showing a degree of retardation. The CIS in the Western sector and parts of Central Asia were making progress as a result of a degree of democratisation but Russia, whilst improving financial intermediation, significantly undermined the privatisation process by re-establishing state control of key industrial sectors, particularly energy. Regulatory barriers and corruption continued to be major business obstacles throughout the region (EBRD 2005).

By 2013 there was evidence that economic reform had stagnated with progress being strongest in countries where democracy had become better founded. This has resulted in a stalling of the convergence with Western European standards, including in the area of firm productivity.

Inevitably part of the reason for the slowdown are the global and Eurozone crises between 2008 and 2010 with both domestic consumption and exports declining, deleveraging on the part of firms, and a virtual cessation of inward capital flows. This was particularly acute in the CEE and SEE regions where unemployment reached double digits. It is also worth noting that both Belarus and Uzbekistan continued to have considerable scope for reform, particularly in relation to price and trade liberalisation. The EBRD (2013) report concludes that the greater the democratisation, the greater the propensity for reform. However, Hartwell (2013) finds that institutional development tends to follow advancement in market reforms, which tend to justify the mantra followed by the Washington Consensus programme. Interestingly, there is evidence from the transitional economies that the greater the proportion of natural resources in the economy, the greater the threat to democracy (EBRD 2013). Overall the crises of 2008/09 appear to have stalled the reform process, which is particularly true of the accession states of the EU where there is evidence of both corporate and political state capture (Innes 2014).

3.3 Business Environment and Enterprise Survey Data

In this context, an Enterprise Survey is firm level research conducted by the World Bank with various regional collaborators using face to face interviews covering a broad range of subjects including, firm level performance measures, government effectiveness, crime, corruption, competition and access to finance. To date over 135,000 interviews have taken place in 139 countries all conducted using the same methodology since 2005.

The BEEPS Surveys are carried out by the World Bank in conjunction with the EBRD. The objective is to elicit feedback from firms to provide robust business environment indicators that are comparable across countries and firms. This includes measurement of productivity and profitability and assesses constraints to firm level performance, together with resource provision and efficiency, climate change adaptation and migration (EBRD 2017). The core questionnaire is disaggregated to facilitate the addressing of specialist questions to the manufacturing and service sectors, which allows the performance of each sector to be separately assessed. For example, in the manufacturing questionnaire, there are questions relating to capital, not included for the service sector.

The BEEPS surveys have been conducted since 1999 but the two utilised in this research were conducted in 2005 (BEEPS III) and 2013 (BEEPSV), with the rationale that the former was timed following the initial EU enlargement round in 2004 and the latter provides a comparison of firms that have spent some post accession time within the EU. There was one standard questionnaire in 2005, however, in 2013 three instruments were used namely, a core questionnaire, and separate manufacturing and retail questionnaires allowing questions specific to each sector.

In the enterprise surveys, the EBRD uses standardized survey instruments to collect firm-level data on the business environment from business owners and senior managers. These standardized instruments allow for firm level cross-country comparisons and analysis. The surveys provide a rich vein of data, including information relating to firm age and size, sales, cost, loan receipt, ownership, innovation, capital investment and export status.

They also include obstacles to business development, providing information across a range of criteria together with the influence of institutions. BEEPS is a firm-level survey based on face-to-face interviews with managers and examines the quality of the business environment. The survey offers a representative picture of the business climate experienced by firms, together with performance and characteristics.

The survey sample provides comparative data across time, countries and firms and allows disaggregation to size, sector and regions. The data is used by the World Bank and EBRD and in the case of the latter forms the basis for the annual transition report. It has also been used in academic and policy papers with more than 450 papers written since 2012 (World Bank 2016). Most of the countries in the sample have four surveys dated 2002, 2005, 2009 and 2013. In the 2005 round, the BEEPS survey included 9,500 enterprises in 28 countries, including Turkey and Turkmenistan, although both these countries have been eliminated from the database as the former does not qualify for inclusion on geographical, political and economic grounds and the latter due to an excessive number of missing values.

The 2013 BEEPS survey consists of 15,861 interviews in 30 countries in Eastern Europe and Central Asia, including Turkey. For the purposes of this thesis Turkey, Mongolia and Turkmenistan have been eliminated; Turkey because it is an outlier in relation to the research and Mongolia and Turkmenistan due to an excessive number of missing values. The 2013 survey now includes Serbia, Montenegro, Bosnia Herzegovina and Kosovo as separate entities. It also includes additional questions, particularly in relation to capital in the manufacturing sector, and now covers balance sheet, replacement and rental capital (leasing).

One of the criticisms of using survey data for measuring firm performance is that, due to its self-reporting nature, it is prone to bias. However, it is more likely that accounting data is subject to a greater element of bias as there are significant incentives to distort financial data, particularly in the areas of tax, asset reporting and remuneration. The BEEPS survey measures the business environment and does not, of itself, measure firm performance. The questions relating to performance tend to be at the end of the interview when the respondent has become comfortable with the non-judgemental nature of the process and it could therefore be argued less susceptible to bias (Beck et al 2005).

Both the 2005 and 2013 surveys consist of a screener questionnaire, conducted by telephone and designed to decide firm eligibility, followed by face to face interviews using, in 2005, a core questionnaire. In 2013, the survey was amended to include or exclude questions relevant to the manufacturing and services sectors. The 2005 survey used simple random sampling, supplemented in some cases by elements of quota sampling. In compiling the sample, each country sample size was determined by the share of population and its sectoral composition, in terms of manufacturing versus services, determined by their relative contribution to GDP. Firms operating in sectors subject to government price regulation and prudential supervision, such as banking, electric power, rail transport, water and waste water, were excluded from the design of the sample. The sample is determined with reference to size and age of firm, where 10% had to be in the small category and a similar number in the large, with all required to be at least four years old. In relation to ownership, 10% had to be foreign owned firms and 10% state owned; 10% of all firms had to be exporters. Within each country the sample was to be distributed evenly by sector determined by the 3-digit ISIC code, with a concession that if it restricted the sample size, the 2-digit level could be utilised. In most countries, firms are small medium sized enterprises, therefore larger firms tend to be oversampled due to their importance in economic development.

The 2013 sample and questionnaire differ from the 2005 survey in some important respects, although steps were taken to mitigate these changes and introduced for the 2009 survey. Since 2008, the survey sample has consisted of the majority of the manufacturing sectors (excluding extraction) and a broad range of services (wholesale, hotels, restaurants, transport, storage, communications, IT) and construction. This corresponds to firms classified with ISIC Revision 3 codes 1515-37, 45, 50-52, 55, 60-64, and 72. Companies must now be registered and have a minimum of 5 employees: there is no age restriction. The 2005 survey used random sampling whereas the 2009 round utilised stratified random sampling, which was continued in 2013. In the 2005 survey, all firms had the probability of being selected and therefore no weighting of observations is necessary, whereas, with stratified random sampling, the population is grouped within homogenous groups and random samples taken from each group.

This allows computing estimates for each group with a specified level of precision and the added advantage of enabling population estimates to be properly weighted for each

individual observation. The sampling weights control for variation in the probabilities of selection across the different strata. This should provide improved quality of estimation, resulting in lower standard errors. A major effort is made to resample firms to provide panel data, but the significant changes made between 2005 and 2013 provides too much uncertainty to rely on the estimations. To ensure the confidentiality of sensitive information such as corruption and business / government relationships, the survey is carried out by private contractors employed by the EBRD.

Whilst covering the same ground, the questionnaires for 2005 and 2013 are markedly different. The 2005 questionnaire is 31 pages including the screener, whereas in 2013 the total is 61. The subject matter covered is summarised in table 3.1 below.

Table 3. 1 Summary of 2005 and 2013 Questionnaires

2005 Questionnaire: 31 Pages, 74 Questions.	
Organisation	Location, sector, Size, Age, Ownership, Privatisation status, Exporting status, Pricing, inputs and source, outputs.
Infrastructure	Energy, Telecommunications, Water, Transportation, Payment Terms, Corruption of Bureaucrats, Crime, Obstacles.
Financing	Source, Collateral, Loan Status, Accounting standards, Subsidies, Obstacles., Sales, Costs including Asset replacement, Investment, Innovation, Capacity Utilisation, Labour including numbers, skills, education, gender.
2013 Questionnaire: 61 Pages, 14 Sections with multiple questions in each section	
Sections A,B and D	Organisation, General Information, Sales, Suppliers
Sections C, I, K and X	Infrastructure, Crime, Finance, Corruption
Sections E, H, G	Competition, Innovation, Land and Permits
Sections J, R, L, M, N, S	Business- Government Relations, Use of Consulting Services, Business Environment, Labour, Performance, Expectations

Source: Author derived from BEEPS 2005 and 2013

The questions utilised from the surveys are designed to elicit specific information. For example, the identification of firms within the EU, sales revenue, costs and number of employees, which enables the calculation of output and profit per worker, plus the identification of firm characteristics of age, size, ownership, the propensity to export, loan receipt and the influence of competition, capital and innovation.

3.4 Data Cleansing and Organisation

The complete data sets are downloaded from the specialist section of the EBRD and World Bank websites, access to which is restricted to researchers. The downloads are in excel csv format and manipulated for transmission to STATA 15 in a format which provides workable data. All firms with no sales recorded are eliminated and all responses of no relevance to the research, excluded. Relevant observations are given abbreviated variable names and the data manipulated for use. Dummy variables (0, 1) are prepared together with additional variables required for computational purposes. In 2013 temporary workers were reported with working duration time, however, in 2005 only the number of temporary workers was given, and their working time has been averaged (number of workers/12) to achieve a full time equivalent. The receipt of loans variable had to be derived from the question "when was the month and year of your last loan" and converted to a 0, 1 dummy. Whilst the 2005 data was reported in US dollars the 2013 data had to be computed using exchange rates derived from the mid-point of 2013 for each country. Profitability, measured per worker, is calculated as gross margin and derived by subtracting, in the case of manufacturing, labour, material and energy costs from the revenue figure and, in the case of services, only using labour and energy. This approach is the only viable alternative since these costs are the only ones consistently reported. This involves, when running the profitability estimators, reducing the sample size significantly, due to missing values relating to the chosen criteria for measurement.

This study employs 2005 BEEPS data for 6,661 firms in 26 Eastern European and Central Asian Countries, since observations for Montenegro and Serbia were identified in the Yugoslavian response. The 2013 survey contained 10,864 firms in 27 Eastern European and Central Asian Countries. These two surveys were selected for analysis since 2005 was the year after the accession of 8 of the 11 countries, which make up the new European member states. This was followed by a further 2 in 2007 with the final country joining in 2013. Most countries in the sample have four surveys in 2002, 2005, 2009 and 2013 (World Bank 2016, EBRD 2016).

The countries surveyed, together with the number of firms interviewed, are included in Table 3.2 below and followed by a graphical depiction in Figure 3.2, 3.3, 3.4. The countries are grouped to allow the identification of the regions in which the countries

and firms are located. The EU member states have been identified earlier in this document but consist of all firms in the CEE and Bulgaria and Romania in the SEE. It should also be noted that neither Georgia nor Ukraine are officially members of the CIS.

Table 3. 2 Number of Firms Interviewed by Country and Year

CEE

Country	No. Firms	
Year	2005	2013
Croatia	192	322
Czech	304	217
Estonia	202	243
Hungary	482	197
Latvia	171	270
Lithuania	180	225
Poland	750	392
Slovak	152	173
Slovenia	202	244

SEE

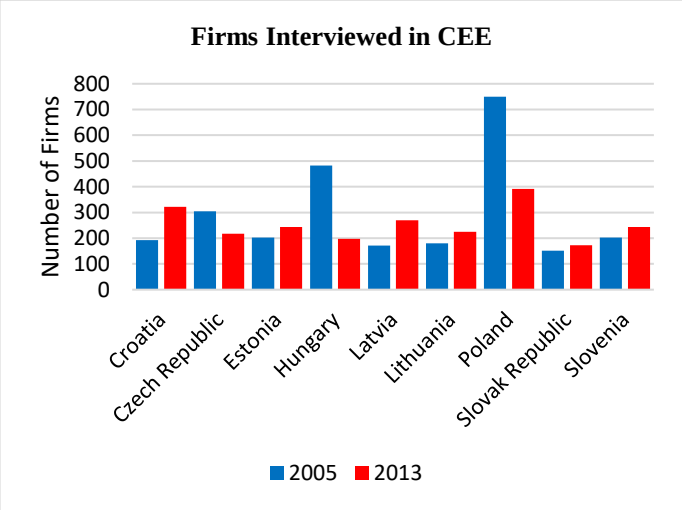
Country	No. Firms	
Year	2005	2013
Albania	146	360
Bosnia	115	297
Bulgaria	214	273
Montenegro	7	102
Kosovo	0	179
Macedonia	106	343
Romania	524	476
Serbia	160	333

CIS

Country	No. Firms	
Year	2005	2013
Armenia	307	245
Azerbaijan	0	248
Belarus	210	285
Georgia	144	289
Kazakhstan	424	430
Kyrgyzstan	160	215
Moldova	244	312
Russia	390	3027
Tajikistan	183	253
Ukraine	453	769
Uzbekistan	237	365

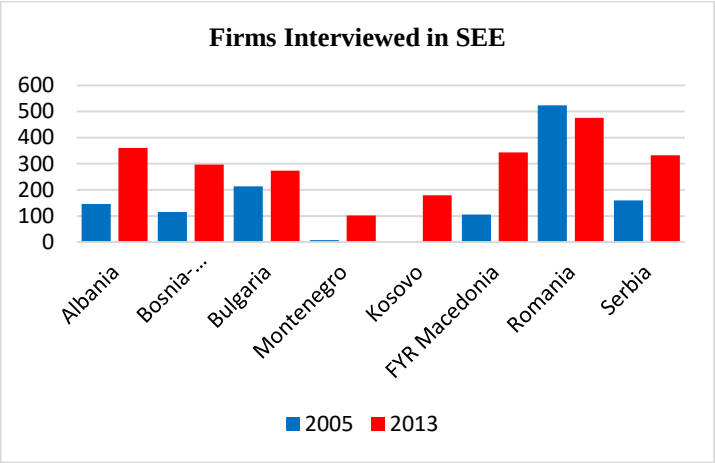
Source: Author derived from BEEPS 2005 and 2013

Figure 3. 2 Firms Interviewed in the EU New Member States



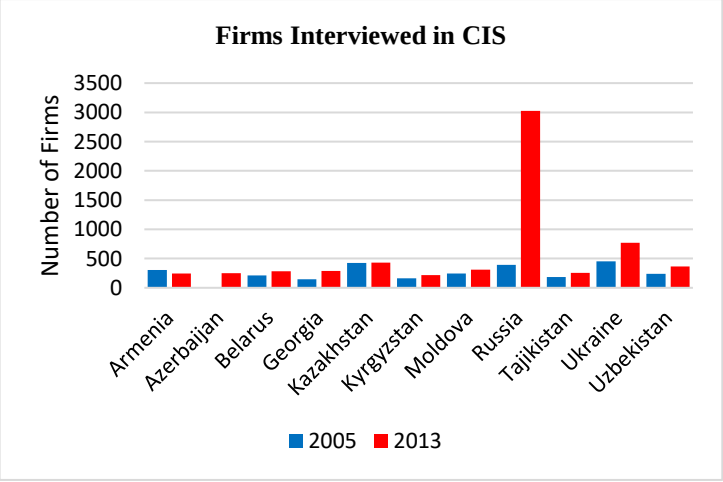
Source: Author derived from BEEPS 2005 and 2013

Figure 3. 3 Firms Interviewed in the South Eastern European States in the EU Accession Process



Source: Author derived from BEEPS 2005 and 2013

Figure 3. 4 Firms Interviewed in the Commonwealth of Independent States



Source: Author derived from BEEPS 2005 and 2013

3.5 World Bank Development Indicator (WDI) and World Bank Governance Indicator (WGI)

3.5.1 World Bank Development Indicators

The WDI data from the World Bank covers 56 years of data and frames a world view of global trends including population, urbanisation, gross national income and gross domestic product.

It is the Bank's unique compilation of cross country data containing more than 1,440 time series indicators for 217 economies and more that 40 country groups. The WDI cover six themes which are promoted by the World Bank; namely, poverty and the need for shared prosperity, human resources including education, employment, health and social protection, the environment and the protection of natural resources, the economy, and countries and their markets and global links, including capital, trade and remittance flow. This thesis uses GDP growth, GDP per capita and consumer price inflation to assess macroeconomic influences in the 28 countries of Eastern Europe for the years 2005 and 2013. A measure of inflation with a GDP deflator was evaluated to achieve a more accurate measure but rejected as it was published as an index and a proliferation of different base years made comparisons unreliable. Table 3.3, 3.4, 3.5 show the macroeconomic data by country of population, GDP growth, GDP per capita and inflation. The countries have been subdivided to identify the economic groups of which they are members, namely the CIS, the accession country candidates for EU accession in SEE and countries which are new member states of the EU.

Table 3.2.a, b, c below shows the macroeconomic indicators of population, GDP growth, GDP per capita and inflation for the region and is followed by detailed commentary supported by graphical illustrations.

Table 3. 3 Macroeconomic Indicators of the CIS

Country	**Pop. M**	**GDP Growth %**		**GDP per Capita $**		**Inflation %**	
Year	**2018**	**2005**	**2013**	**2005**	**2013**	**2005**	**2013**
Armenia	2.9	13.87	3.30	1643.76	3843.59	0.6	5.8
Azerbaijan	9.9	26.40	5.80	1578.40	7875.76	9.7	2.4
Belarus	9.4	9.40	1.02	3126.07	7978.83	10.3	18.3
Georgia	3.9	9.60	3.39	1530.06	4274.38	8.2	-0.5
Kazakhstan	18.4	9.70	6.00	3771.28	13890.86	7.6	5.8
Kyrgyzstan	6.1	-0.18	10.92	476.55	1282.44	4.4	6.6
Moldova	4	7.50	9.40	831.21	2243.98	11.8	4.6
Russia	144.1	6.38	1.28	5323.47	15543.68	12.7	6.8
Tajikistan	9.1	6.70	7.40	337.36	1040.21	7.1	5.0
Ukraine	44	2.70	-0.03	1828.72	4029.72	13.6	-0.3
Uzbekistan	32.4	7.00	8.00	546.78	1907.55	21.4	14.3
Average	25.8	9.0	5.1	1908.5	5810.1	9.8	6.3

Source: Author from Data mined from the World Bank 2018.

Table 3. 4 Macroeconomic Indicators for the SEE

Country	Pop. M	GDP Growth %		GDP per Capita $		Inflation %	
Year	2018	2005	2013	2005	2013	2005	2013
Albania	2.9	5.72	1.11	2709.14	4414.72	2.4	1.9
Bosnia	3.5	8.76	2.39	2968.41	5035.87	2.8	-0.3
Macedonia	2.1	4.72	2.93	3037.75	5211.50	0.2	2.8
Kosovo	1.8	N/A	N/A	N/A	N/A	-3.2	2.2
Montenegro	0.6	4.19	3.55	3674.62	7186.43	4.3	2.1
Serbia	8.8	5.54	2.57	3528.13	6353.83	16.1	7.7
Average	3.3	4.8	2.1	2653.0	4700.4	3.8	2.7

Source: Author from Data mined from the World Bank 2018.

Table 3. 5 Macroeconomic Indicators for the EU

Country	Pop. M	GDP Growth %		GDP per Capita $		Inflation %	
Year	2018	2005	2013	2005	2013	2005	2013
Bulgaria	7.0	7.24	0.86	3893.69	7674.86	5.0	0.9
Croatia	4.2	4.16	-1.06	10224.24	13574.74	3.3	2.2
Czech Rep	1.3	6.44	-0.48	13317.73	19916.02	1.8	1.4
Estonia	9.7	9.37	1.42	10338.31	19029.77	4.1	2.8
Hungary	1.9	4.38	2.12	11161.72	13613.60	3.6	1.7
Latvia	2.9	10.70	2.63	7558.74	15032.23	6.7	0.0
Lithuania	38.1	7.73	3.51	7863.16	15712.82	2.6	1.0
Poland	19.6	3.49	1.39	8021.25	13780.55	2.2	1.0
Romania	5.1	4.17	3.53	4676.32	9585.27	9.0	4.0
Slovakia	2.1	6.75	1.49	11669.42	18191.61	2.7	1.4
Slovenia	9.3	4.00	-1.09	18169.18	23150.32	2.5	1.8
Average		6.2	1.3	9717.6	15387.4	4.0	1.7

Source: Author from Data mined from the World Bank 2018.

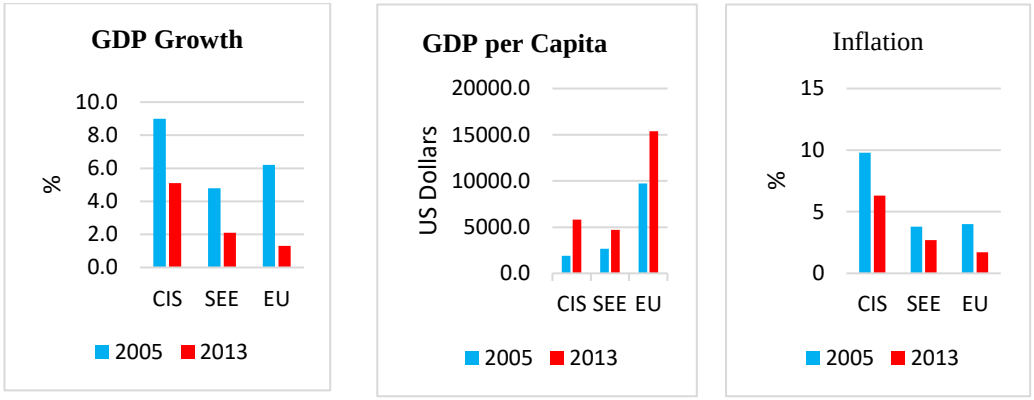
Reference to Figures 3.5, 3.6, 3.7 indicates that the population of the region is dominated by Russia at 144.1 million and with Ukraine (44m), Uzbekistan (32.4m) and Kazakhstan (18.4m) representing 84% of the CIS total. In comparison, the SEE average is a mere 3.3 million and the new member states 9.3 million, with Poland (38.1m) and Romania (19.6m) being the most populous countries. On average, the CIS countries enjoyed a greater level of GDP growth in both 2005 and 2013 despite having the highest rate of inflation.

It is evident that both the accession countries of SEE and particularly members of the EU suffered a significant decline in growth as a result of both the global and Eurozone crises. It is interesting to note that despite the crises predating the survey in 2013, the new member states of the EU continued to experience sluggish growth of 1.3%. Inflation was a problem throughout the region in 2005, particularly in the CIS where it was running at 14.1%, continuing at a troubling 6.3% in 2013. The GDP per capita shows the EU states with levels that are two thirds the size of both the CIS and SEE,

with the former outperforming the latter despite their status in the accession process and the high degree of support afforded them by the EU.

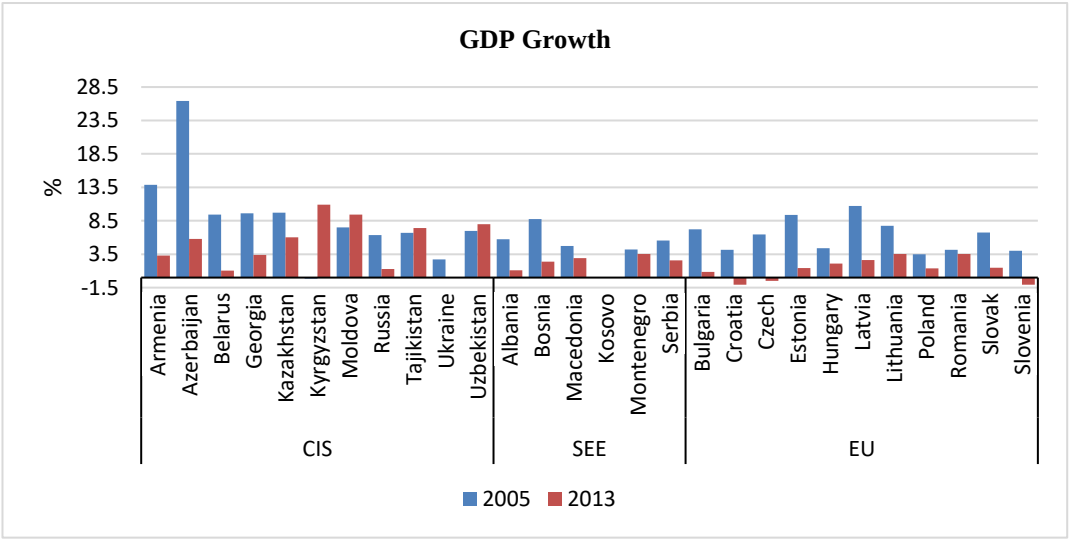
Figure 3. 5 a, b, c

a. **b.** **c.**



Source: Author derived from BEEPS 2005 and 2013

Figure 3. 6 GDP Growth by Country sub divided by Region



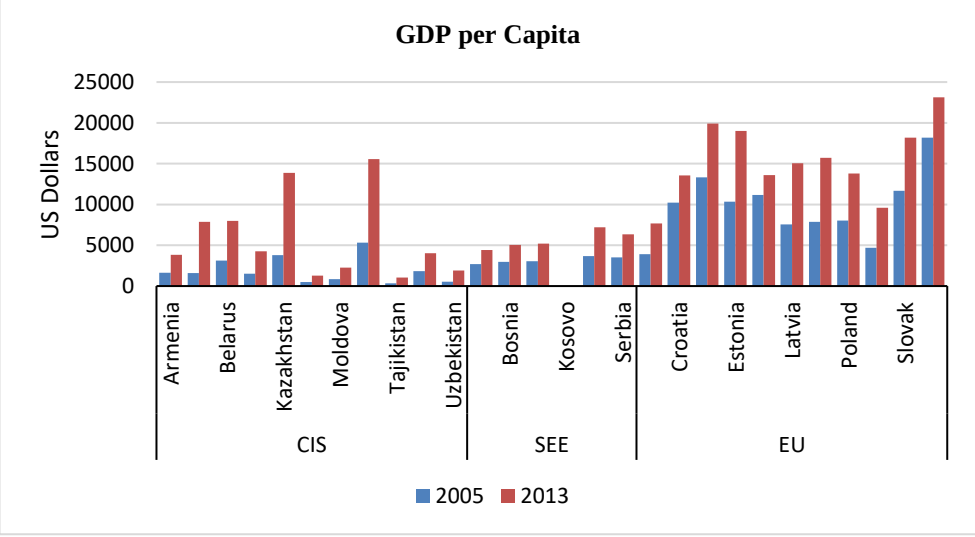
Source: Author from Data Supplied by World Bank 2018

Figure 3.7 below illustrates GDP per capita and shows a different picture to the growth model. All countries in the region show an increase in GDP per capita between 2005 and 2013; some from a low base. Given the decline in growth rates, this would suggest that all states have seen productivity improvements. However, it should be recognised that both currency exchange rates (from LCU to USD) and inflation will be influential. It will be noted that, excepting Bulgaria and Romania, the NMS occupy the top 9 places in 2005 with only Russia separating them from the tenth and eleventh positions.

Given the GDP growth numbers, this may be a reflection of the fact that these countries started from a higher base. Bulgaria and Romania joined the EU in 2007, only one year from the beginning of the global financial crisis, which may have had some influence on its growth, albeit that both, particularly Romania, grew between 2005 and 2013. In 2004, the accession of these two countries was delayed allowing more time to complete their adherence to the protocol of the *Acquis Communautaire* and there is some indication that corruption and state capture was, and continues to be, problematical. Given the level of EU support, the accession countries of the SEE continue to fail to improve GDP per capita at the level anticipated. This may be the result of a disenchantment with the speed of the accession process, the slow pace of institutional development or the level of corruption prevalent.

Within the CIS, Russia, Kazakhstan, Azerbaijan and Belarus stand out and compare favourably with both the SEE and CEE. The first three benefit from their abundance of natural resources whilst Belarus benefits from its closeness to the Russian economy. It is therefore evident that, albeit from a higher base, the new member states of the EU have benefitted from membership and have succeeded in consolidating their GDP per capita in difficult economic circumstances.

Figure 3. 7 GDP per Capita by Country sub Divided by Region



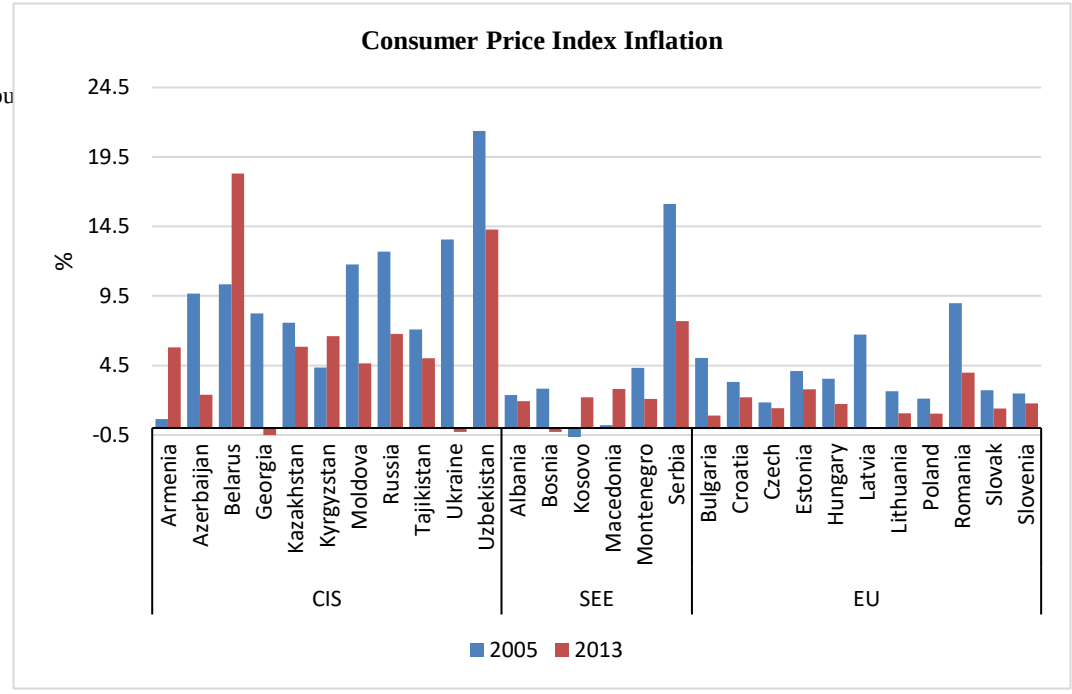
Source: Author from Data Supplied by World Bank 2018

Figure 3.8 below shows the influence of inflation on each of the Eastern European economies. In 2005, inflation was particularly problematical in both the CIS and EU economies; in relation to the former, only Armenia and Kyrgyzstan had inflation under

7% with Belarus, Moldova, Russia, Ukraine and Uzbekistan exceeding 10%. This was the result of fiscal surpluses created by rising oil prices allied to a rapid increase in the availability of consumer credit. The problem was not as acute in the EU countries although Romania and Latvia were affected. In this case, the accession process resulting in the harmonisation of certain aspects of taxation namely, excise duty on fuel and alcohol and the alignment of rates of VAT together with the expansion of consumer credit, induced an inflationary effect. In the SEE, with the exception of Serbia and Montenegro, inflation was much more constrained with strong wage growth, price increases and the high cost of oil affecting the exceptions.

In 2013, with the exception of Armenia, Belarus and Kyrgyzstan in the CIS and Kosovo and Macedonia in the SEE, inflation generally fell sharply throughout the regions. Again with the exception of Belarus, this was from a low or negative base indicating a healthier economic climate.

Figure 3. 8 Inflation by Country sub divided by Region



Source: Author from Data Supplied by World Bank 2018

Overall, in both 2005 and 2013 the CIS enjoyed a higher GDP growth than either the EU countries or the SEE, albeit that, from a higher base, the EU states have a GDP per capita over two thirds the value of the other two regions. In 2013 inflationary pressure

has been felt more deeply in the CIS but the fall in demand in Europe caused three of the NMS to fall into recession in 2013. This raises some questions about the claims of a successful accession process into the EU on which this research may throw some light.

3.5.2 World Bank Governance Indicators

The thesis uses WGI to assess country institutional influences. The indicators fall into two primary categories; rules and outcome-based governance. Most of the indicators of governance are outcome based, although a number of the rules-based indices also measure outcomes.

Six measures of governance have covered data from 200 countries since 1996. The indicators use 31 different sources and many hundreds of variables including surveys, nongovernmental, commercial and public sector organisations covering accountability, political stability, regulatory quality, rule of law and corruption control.

This research uses four of the six measures:

Government effectiveness; measuring perceptions of the quality of public service, the efficiency of the civil service, freedom from political pressure and the effectiveness and commitment to sound policies.

The rule of law; capturing the extent to which government and society has confidence in and respects the laws of the country, particularly property rights, the judicial system, contract enforcement and the control of criminality.

Regulatory control; measuring the ability of government to formulate and implement sound policies and regulations that permit and promote private sector development.

Political stability; capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism (Kaufmann et al. 2010).

Corruption is a further and important measurement however the WGI corruption index has been forced to adopt different criteria for individual countries making comparisons problematical. Therefore, Transparency International's Corruption Perception Index has been utilised and is covered later in this chapter.

The methodology used to compile the index uses an Unobserved Components Model which decomposes time series data to provide trends, seasonal and cyclical

information and idiosyncratic components allowing for exogenous variables (Fomby 2008). This standardises the data, creates an aggregated indicator of governance as a weighted average and allows the construction of a margin of error. The latter is important because of the imprecise measure of measuring governance issues. This imprecision is important and the published standard errors and confidence intervals allow the researcher to interpret the data taking cognisance of the uncertainty involved in the collection of such data. For example, overlapping confidence intervals between country measurements will inform the researcher that any comparison is spurious due to a lack of statistical significance (Kaufmann et al. 2010). The measurement results are reported in two ways, namely, an indicator ranging from -2.5 to plus 2.5 and, in percentile form from 0% to 100%. The higher the score the stronger the governance perspective. This research uses the former measurement.

Table 3.6, 3.7, and 3.8 below shows the average governance indicators for each of the regions. It is clear that in both 2005 and 2013 members of the EU had a positive and improving score across all categories. The other two regions display a negative result in 2005 and although improving, a similar result in 2013. The only exception being the SEE, which have succeeded in moving regulatory control into positive territory. Scores in the CIS are inferior to those in the accession countries of the SEE, albeit that the latter's results are not encouraging from the point of view of attaining EU membership in the foreseeable future. Overall, it is apparent that accession to the EU and adherence to the Acqui Communautaire has produced a positive result from the point of view of institutional development and the effect is continuing to pay dividends in this respect. The results are graphically illustrated in Figure 3.9 below.

Table 3. 6 World Governance Indices-CIS

Country	Government Effectiveness		Rule of Law		Regulations		Political Stability	
Year	2005	2013	2005	2013	2005	2013	2005	2013
Armenia	-0.13	0.09	-0.37	-0.32	0.08	0.25	-0.06	0.07
Azerbaijan	-0.68	-0.46	-0.74	-0.68	-0.55	-0.41	-1.11	-0.41
Belarus	-1.1	-0.93	-1.19	-0.88	-1.48	-1.08	0.35	-0.04
Georgia	-0.42	0.58	-0.72	-0.01	-0.51	0.75	-0.68	-0.43
Kazakhstan	-0.55	-0.53	-0.82	-0.66	-0.33	-0.37	0.18	-0.38
Kyrgyzstan	-0.83	-0.64	-1.12	-1.13	-0.88	-0.31	-1.13	-0.91
Moldova	-0.73	-0.39	-0.4	-0.4	-0.46	-0.07	-0.44	-0.02
Russia	-0.46	-0.35	-0.9	-0.78	-0.17	-0.36	-1.25	-0.74
Tajikistan	-1.06	-1.07	-1.02	-1.23	-1.09	-1.05	-1.37	-1.13
Ukraine	-0.58	-0.64	-0.79	-0.82	-0.5	-0.63	-0.27	-0.76
Uzbekistan	-1.2	-0.94	-1.44	-1.2	-1.59	-1.62	-1.97	-0.55
Average	-0.7	-0.5	-0.9	-0.7	-0.7	-0.4	-0.7	-0.5

Table 3. 7 World Governance Indices-SEE

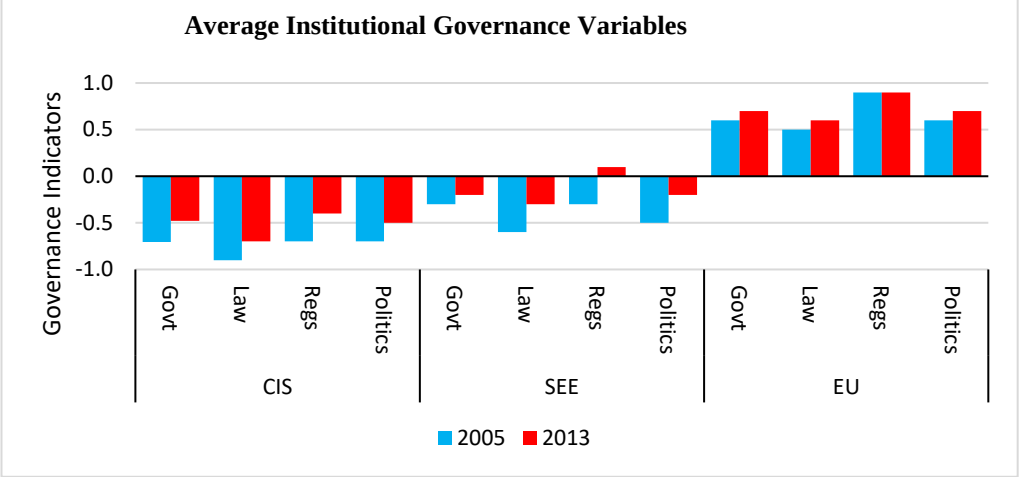
Country	Government Effectiveness		Rule of Law		Regulations		Political Stability	
Albania	-0.62	-0.32	-0.62	-0.32	-0.3	0.21	-0.49	0.05
Bosnia	-0.71	-0.43	-0.56	-0.15	-0.49	-0.07	-0.47	-0.38
Kosovo	..	-0.4	-0.99	-0.56	..	-0.03	..	-1.01
Macedonia	-0.28	-0.05	-0.37	-0.19	-0.19	0.33	-1.18	-0.37
Montenegro	0.36	0.17	-0.28	0.03	-0.13	0.06	..	0.46
Serbia	-0.31	-0.09	-0.91	-0.34	-0.55	-0.06	-0.76	-0.08
Average	-0.3	-0.2	-0.6	-0.3	-0.3	0.1	-0.5	-0.2

Table 3. 8 World Governance Indices-EU

Country	Government Effectiveness		Rule of Law		Regulations		Political Stability	
Bulgaria	0.19	0.16	-0.16	-0.13	0.64	0.53	0.13	0.15
Croatia	0.48	0.7	0.09	0.27	0.49	0.45	0.43	0.61
Czech	0.97	0.89	0.82	1.01	1.11	1.09	0.9	1.05
Estonia	0.99	1	0.92	1.18	1.34	1.44	0.58	0.73
Hungary	0.8	0.66	0.83	0.57	1.11	0.89	0.98	0.78
Latvia	0.59	0.89	0.59	0.76	0.94	1.04	0.78	0.59
Lithuania	0.79	0.84	0.58	0.8	1.03	1.15	0.75	0.94
Poland	0.48	0.72	0.42	0.79	0.82	1.05	0.34	0.96
Romania	-0.27	-0.06	-0.17	0.11	0.21	0.61	0.07	0.16
Slovak	0.94	0.79	0.52	0.46	1.17	0.92	0.85	1.1
Slovenia	0.92	1.01	0.86	0.98	0.83	0.62	1.05	0.87
Average	0.6	0.7	0.5	0.6	0.9	0.9	0.6	0.7

Source: Author from Data Supplied by World Bank 2018

Figure 3. 9 Average Institutional Governance Variable by Region



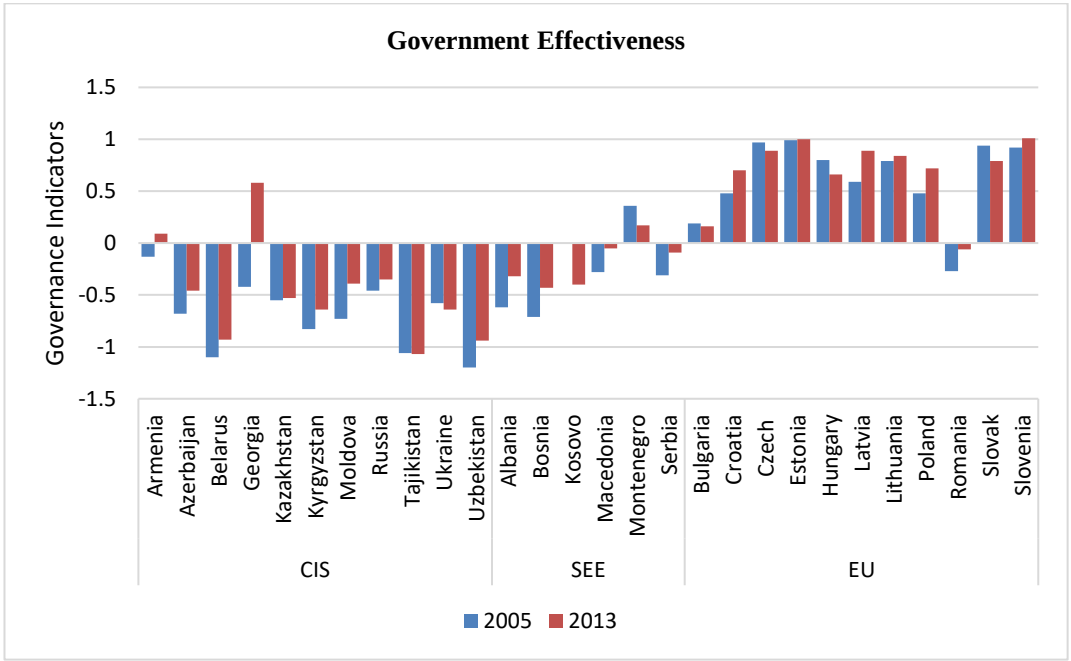
Source: Author from Data Supplied by World Bank 2018

Reference to Figure 3.10 below shows, in graphical form, the government effectiveness index by country. It will be noted that, except for Montenegro, all the countries achieving a positive score in both 2005 and 2013 were either already members of the EU, or in the accession process and that Montenegro is currently regarded as the most advanced Balkan candidate. The only EU state that is an exception is Romania, with negative scores in both years, and together with Bulgaria, which is negative in 2005 and only marginally positive in 2013, is regarded as a state that poses particular challenges to the EU as a result of rampant corruption, significant emigration and unpredictable legislatures. The problem in relation to the comparatively modest scores of the new member states (NMS), is the issue of state capture, defined as the element of systemic political corruption in which private interests gain an advantage by significantly influencing the government's decision-making processes. The development of the NMS has inevitably been influenced by the historical context of their transition, and the lowly scores, which have continued since accession, are possibly the result of either political or corporate state capture. The former is the result of powerful political parties pursuing a monopoly in exercising political power, whilst the latter exercise power for private gain by allowing private entities to subvert the political system in their own interests (Hellman et al., 2000). Romania, Bulgaria, and the Czech and Slovak Republics tend to favour corporatism, whereas Poland and Hungary are more politically influenced.

The Baltic states and Slovenia have models which are closer to the EU15 (Innes 2014). In relation to the Non-EU member states, all have negative scores, with the exception of the already mentioned Montenegro and Georgia, which in 2013 moved from a negative -0.42 in 2005 to 0.58 and, Armenia which advanced from -0.13 to 0.09; a modest but significant gain. The worst performers are Belarus, Kyrgyzstan, Tajikistan, Ukraine and Uzbekistan; all listed in the 2015 Freedom House report as partly or not free.

The reasons for the divergence in the effective control of corruption may lie in a different aspect of the political landscape, together with the emergence of powerful groups capable of appointing strong figures to promote self-interest, despite opposition from managerial and civil service classes. This conflict, in the crucial period of transition, may be the reason why a more entrepreneurial environment has not emerged in these states (Estrin 2002). Thus, from the perspective of government development, it is apparent that the work required to meet the EU's criteria for admission has generally borne fruit with Romania, and to a lesser extent Bulgaria, continuing to be work in progress, whilst the more repressive regimes of the non-member states are regarded as the least effective.

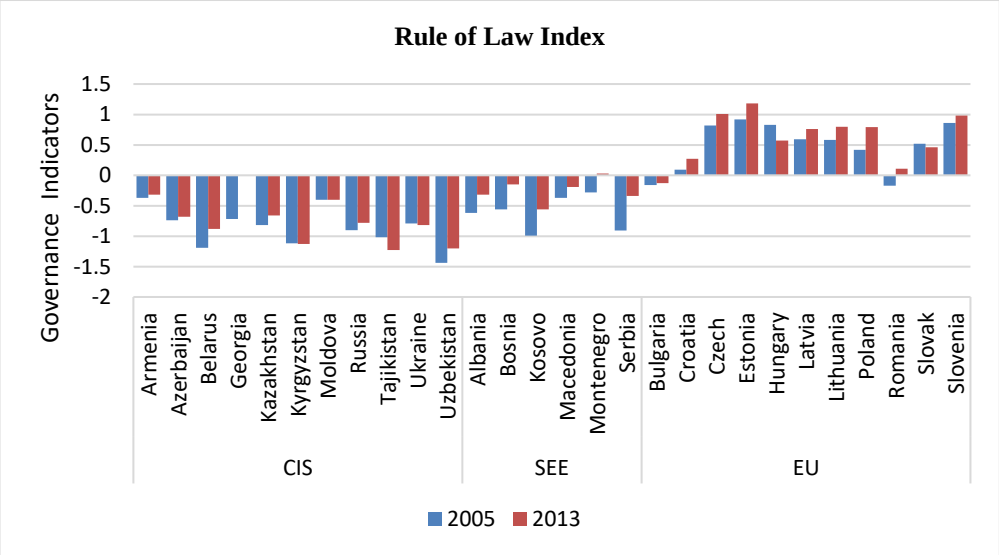
Figure 3. 10 WGI Government Effectiveness Index by Country



Source: Author from Data Supplied by World Bank 2018

The rule of law index, shown in figure 3.11 below, unsurprisingly shows a similar pattern to the government effectiveness chart in which, amongst EU member states, Bulgaria and Romania is joined by Croatia, in showing a negative or marginal performance. Whilst Hungary's score remains respectable, it is the only country within the NMS that has deteriorated, possibly reflecting the increasingly authoritarian stance of the country's Prime Minister since 2010, Viktor Orban. Amongst the non-member states, Russia has joined Belarus, Kyrgyzstan, Tajikistan, Ukraine and Uzbekistan as the worst performers, reflecting the increasing use of the judicial system to maintain political control. The NMS' adherence to the rule of law is under threat from populist movements or rent seeking elites, which are opposite sides of the same coin. The populist governments of Poland and Hungary claim to be the voice of the people providing credence to their attack on the judicial systems and the governance that underpins it, whilst the rent seeking governments of Bulgaria and Romania adopt the same approach from a different perspective. A European Commission report indicates that the problem is not confined to these four countries and suggests that the problem was widespread across all the NMS resulting from their post-communist past. It would appear that, in the build up to accession, the NMS ensured they adhered to all the accession criteria, only to dismantle the mechanisms that supported the rule of law and anti-corruption measures thereafter (Bugari 2008, Scheppele 2013, Dimitrova 2015).

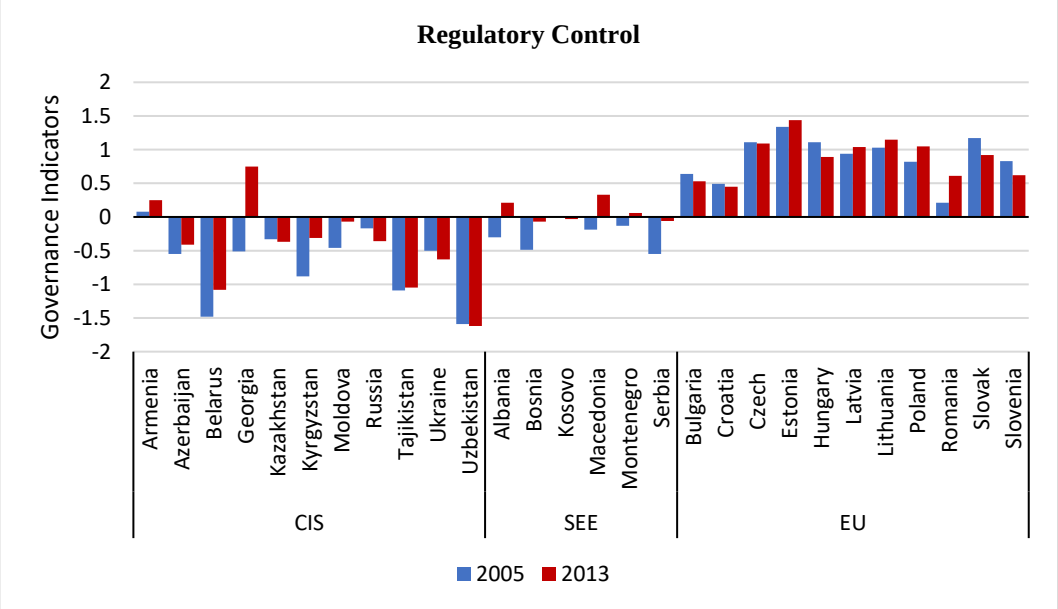
Figure 3. 11 WGI Rule of Law Index by Country



Source: Author from Data Supplied by World Bank 2018

Figure 3.12 below shows the effectiveness of regulatory regimes and here the position is more nuanced and encouraging. Only Belarus, Tajikistan and Uzbekistan demonstrate a continuing weakness in this aspect of institutional reform, with other countries, particularly in 2013, closer to the zero markers. Amongst the NMS, Romania demonstrates a more positive regulatory regime providing some comfort that further institutional reform is an achievable objective. However, Bulgaria, Croatia, Czech Republic, Hungary, Slovak Republic and Slovenia all claim a diminution in regulatory control in 2013. The countries of the SEE show some improvement in 2013, which may be the result of the EU accession process. In 2005, firms reported that the biggest obstacles to doing business were the costs of business regulation, the quality of institutions, macroeconomic instability and regulatory uncertainty; the more productive firms being the most adversely affected (EBRD Transition Report 2005). The EBRD 2013 Transition suggests that little progress has been made in the intervening period citing a lack of political will. The figure below confirms these findings.

Figure 3. 12 WGI Regulatory Control Index by Country

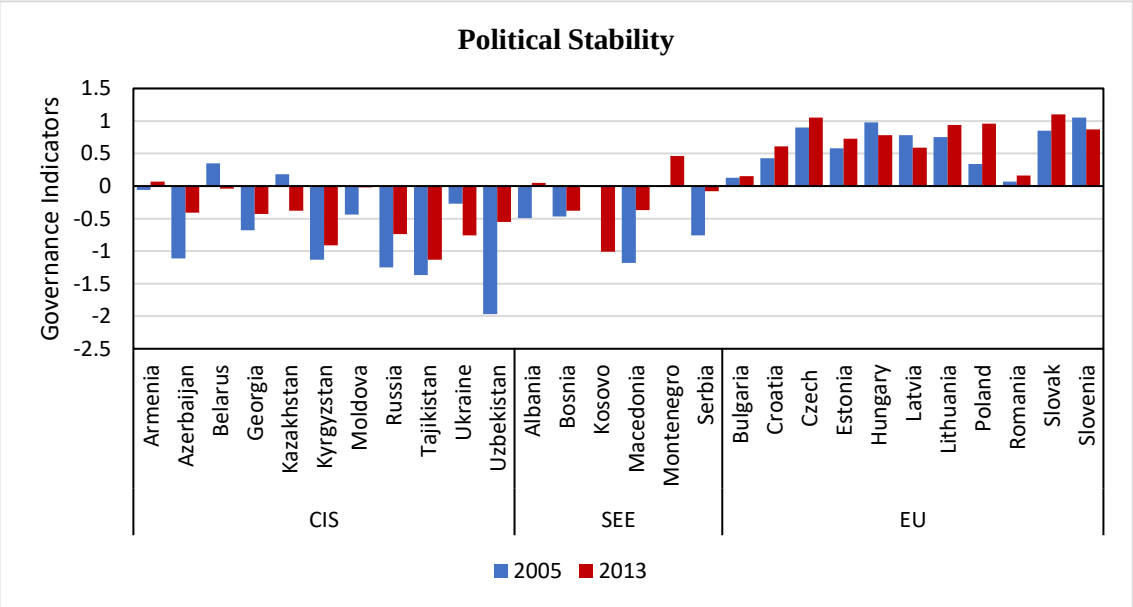


Source: Author from Data Supplied by World Bank 2018

The political stability index shown in Figure 3.13 below demonstrates significant improvements in political stability throughout the region, albeit with some exceptions. Amongst the NMS, Bulgaria and Romania continue to score at the margin, whilst Slovenia and Hungary have deteriorated, again reflecting Orban's grip on power since 2010. The political environment in the non-member states has improved significantly

during the intervening years, although all states continue with a negative index score. In central Europe, one of the failures of EU membership is the lack of protection from power-concentrating politicians and rent-seeking elites. The people of Hungary, Bulgaria, Poland and Czechoslovakia may vote for politicians who defy the EU, but polls show that they still support EU membership in the hope that it can constrain state capture. In the Balkans, the starting conditions are more difficult because states are weak and administrative capacity low. While Serbia inherited the state institutions of Yugoslavia, other countries had to build them from scratch, after independence. The region has still not recovered from the legacy of the post-Yugoslav wars, with unresolved status issues long preventing regional co-operation and economic integration. In most of the Balkan countries, the prerequisites are not in place for reformers to take advantage of the accession process to bring about systemic transformation. Large parts of the state administrations have continued to comply with EU law, but the Union's impact on political culture is much more superficial.

Figure 3.13 WGI Political Stability Index by Country



Source: Author from Data Supplied by World Bank 2018

Overall there is a clear negativity surrounding the measurement of the key institutional components in 2005 and 2013 in both the CIS and SEE with the rule of law proving the most negative in relation to effectiveness. In the case of the CIS, an average score across 2005 and 2013 is -0.8 and -0.5 for the SEE, which contrasts with 0.6 for the new member states of the EU. However, to put this in perspective these scores contrast

with 1.7 for the United Kingdom, which provides a measure of the distance the transition economies have to travel in terms of institutional development.

3.6 Transparency International Data

The thesis relies on the corruption perception index of Transparency International (TI) for an assessment of corruption. TI is an independent nongovernmental organisation dedicated to the global control of corruption, working with government, business and civil society to encourage the establishment of measures to control corruption. The index scores from 0 to 100; the higher the score, the less prevalent the corruption (Transparency International 2017).

The WGI also measures corruption using the same criteria and in many instances the same sources as TI and both accept that there are problems of both source and methodology attached to their indices. The TI methodology is preferred because of its universal acceptance and the opportunity to measure an element of governance through a different perspective than the World Bank, to some degree providing a robustness check on the WGI methodology.

Table 3.9 below shows the index scores for each institutional control variable selected for both 2005 and 2013. In general terms the key indices show an improvement in 2013 against 2005, with EU member states indicating a more robust institutional environment. A detailed analysis is provided below with graphical evidence.

Table 3. 9 a, b, c Corruption Perception Index by Region and Country

a. EU

Country	2005	2013
Bulgaria	40	41
Croatia	34	48
Czech	43	48
Estonia	64	68
Hungary	50	54
Latvia	42	53
Lithuania	48	57
Poland	34	60
Romania	30	43
Slovak	43	47
Slovenia	61	57
Average	25	30

b. CEE

Country	2005	2013
Albania	24	31
Bosnia	29	42
Kosovo	28	33
Macedonia	27	44
Montenegro	28	44
Serbia	28	42
Average	27	39

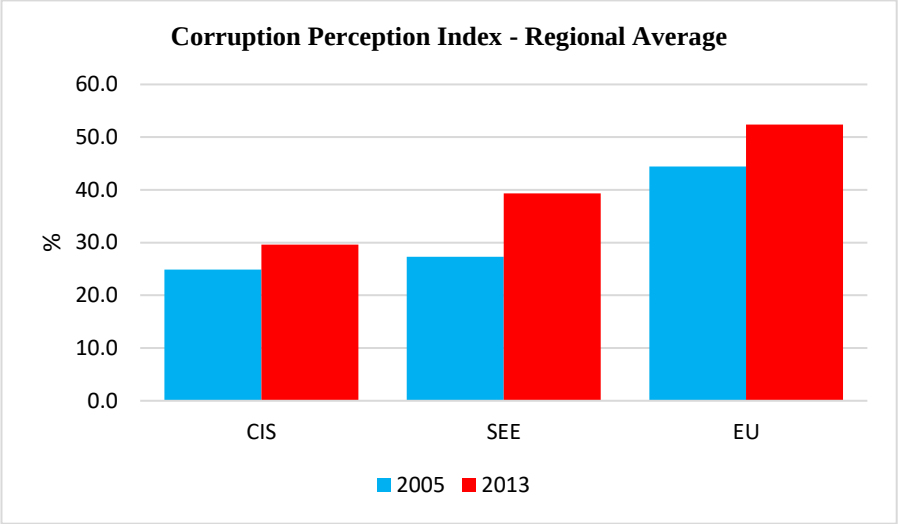
c. CIS

Country	2005	2013
Armenia	29	36
Azerbaijan	29	36
Belarus	22	28
Georgia	23	49
Kazakhstan	26	26
Kyrgyzstan	23	24
Moldova	29	35
Russia	24	28
Tajikistan	21	22
Ukraine	26	25
Uzbekistan	22	17
Average	25	30

Source: Author from Data Supplied by Transparency International 2018

Figure 3.14 below shows that the CIS is the worst performer of the three regions in relation to corruption and shows the least improvement between 2005 and 2013. In 2013 the average for the CIS was just under 30 with the SEE some 10% higher and the new member states of the EU at just over 50%. In contrast, the EU15 averaged 73%, albeit, Italy and Greece recorded 42% and 40% respectively. However, allied to the institutional governance indicators discussed previously in this chapter, these results go some way to explaining the lack of economic convergence between Eastern and Western Europe.

Figure 3. 14 Regional Average for Corruption Perception Index

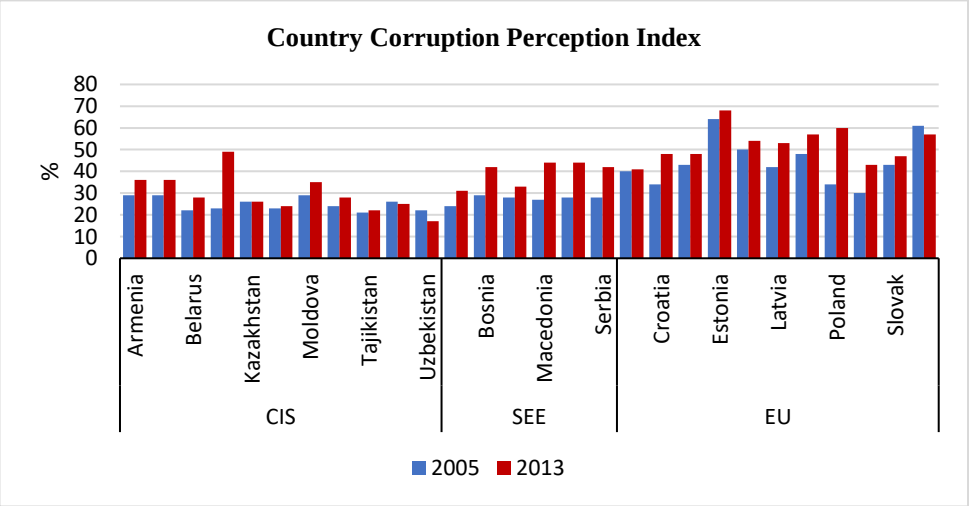


Source: Author from Data Supplied by World Bank 2018

The corruption index for all countries in this research study, produced at Figure 3.13 below, demonstrates the level of perceived corruption within the individual Eastern European States; the most corrupt, with the exception of Azerbaijan, being the republics of Central Asia, all members of the Commonwealth of Independent States. Thus, whilst political stability has improved, these countries continue to experience serious problems of corruption. Within the NMS of the EU, only five of the eleven states are in the top fifty countries by rank. Bulgaria, Romania and Croatia continue to demonstrate a high level of corruption, and only the Baltic States, Poland and Slovenia are ranked in the top fifty globally, with Poland having made great advances in the reduction of corrupt practices since 2005. It should also be noted that the Western Balkan states, all of whom are in the EU accession process, continue to be amongst the most corrupt nations globally and when this result is allied to that of their near

neighbours Bulgaria and Romania, it brings into question the validity of their claims for membership. The most significant obstacles found by firms in CEE states is corruption in relation to labour regulation and government contracts, whilst CIS countries include problems of state capture and ensuing government corruption. The whole issue of corruption is distorted by the fact that, in some transitional "high capture" economies, firms resorting to bribery are more successful than those that do not (Hellman et al. 2003 pp 770). There may be a causality paradox here in that corrupt officials may target the most successful firms, as opposed to the act of bribery creating a more favourable environment (EBRD 2005). Figure 3.15 below demonstrates that progress has been made in tackling corrupt practices although, with the exception of Georgia this is barely discernible in the CIS. In both the SEE and EU more advancement is apparent, although Albania, Bulgaria and Romania show little progress. When the scores from Greece and Italy are included, it is apparent that South Eastern Europe has a systemic problem with corruption. The introduction of anti-corruption laws, improving management, creating a more competitive environment or reducing regulatory control is hampered when systemic obstacles such as a lack of democracy, political polarisation and an aversion to a free market are prevalent. Opposition to the reduction of corruption can come from government, political groups or elite vested interests supported by a cadre of corrupt officials (EBRD 2013, Williams and Horodnic 2015).

Figure 3. 15 Corruption Perception Index by Country with Regional sub Divisions



Source: Author from Data Supplied by World Bank 2018

It is clear that corruption continues to be a major problem throughout the region under study with the possible exception of the Baltic States. This poses not only societal problems but also prevents the economy from working efficiently and assists and encourages the agents of state capture.

In relation to institutional development, it is clear that the NMS display greater improvement than that achieved by the non-member states. This would suggest that the EU's adoption of the main tenets of the WC programme have proved advantageous with non-members, and particularly the CIS, demonstrating that the less democratic the regime, the least developed the key governmental institutions. (Acemoglu et al. 2003; Hnatkovska and Loayza 2005; Loayza et al. 2007; Ramey and Ramey 1995). Ten years after accession, it is problematical for the EU that Bulgaria and Romania are making such slow progress in improving their institutional environment and that the accession states of the Western Balkans are equally tardy in demonstrating their fitness for membership. The level of corruption in the region is high and, with the exception of the Baltic States and Poland, this also applies to the NMS with the more corrupt states having a more retarded institutional regime.

3.7 Variable Selection

The research uses two econometric models, and both are treatment applications namely Inverse Probability Regression Adjustment (IPWRA) and Quantile Treatment Estimator (QTE). Both estimates, primarily, the effect of EU membership on firm performance measured as output per worker (productivity) and profit per worker which are the two dependent variables. The latter is used only in chapter 5 and is strictly a robustness check since the main thrust of the thesis relates to productivity. The treatment variable is EU membership in all cases with the QTE model adopting a multi valued approach when four additional treatment variables are deployed. Chapter six dealing specifically with the Western Balkans, includes receipt of loans as a standalone separate treatment variable. The selection of variables, including the identification of productivity and profit as a measure of firm level performance when applied to each model, is designed to produce a different perspective of the effect of key variables identified in literature as influential in this process. Some of the control variables selected also serve as additional treatment variables, when co-joined with EU membership in the IPWRA model. All the models utilise the full sample, controlling

for the manufacturing and service sectors with the use of a dummy variable (Manufacturing=1 and Services=0).

All the empirical chapters disaggregate the sectors and reports on the full sample and the manufacturing and service sectors. A number of explanatory and control variables are utilised which are described below.

The dependent variable productivity, measured as output per worker, has been selected as a measure of firm level performance due to its importance to economic growth. The harnessing of the productive inputs of capital, labour and technology are at the heart of a successful economy. A comprehensive review of literature suggests that whilst managers have a good deal of control over the endogenous determinants of production, they can do little about exogenous influences (Syverson 2011). Whilst literature exists on the subject (Syverson 2011) the majority deals with the specific issues grounded in theory; little exists that examines the relative performance of firms subjected to geopolitical economic shocks, the overall effect of multiple conditional variables, the materiality of funds flow and capital allocation. The use of output per worker as a measure of productivity follows other papers which have used BEEPS data and log of sales, divided by total employees, for measurement purposes (see D'Souza et al 2017, Pfeifer 2015, Waldkirch 2014, Dutz and O'Conell 2013, Gorodnichenko and Schnitzer 2013, Ricci and Trionfetti 2012). Whilst productivity and profitability are highly correlated, there are important differences relating to the application of market power, the potential for market demand shifts and whether firms are price setters or takers. Measuring two aspects of firm level performance acts as a robustness check on the outcome (Foster et al. 2008).

The use of EU membership as a treatment variable allows a comparison of the productivity of firms within and outside the EU. This permits an analysis of the effect of the economic shock of joining a significantly more productive economic block. There is some evidence that the NMS are beginning to achieve convergence with the original EU 15, albeit at a lower base due to economic stagnation in the Eurozone (Havlik 2015). Equally the EBRD 2016 Transition Report believes that progress in the Balkans is being retarded as a result of financial imbalances, credit constraint and a lack of FDI (see also Estrin and Uvalic 2016). The misallocation of capital may be an additional constraint (Gopinath et al 2015).

This justifies the use of the second treatment variable; access to finance, measured as receipt of loans in Chapter six relating specifically to the Western Balkans. A further selection of matching variables is used in Chapter five where a multivalued approach is utilised to measure the interaction between EU membership and key determinants of firm performance. The use of a multi valued treatment approach measures firm performance against a combination of two treatment variables, namely EU membership and loans, foreign ownership, exporting and research and development (innovation). The selection of matching variables is predicated by reference to literature, where each has been identified as influencing firm level performance. To minimise the selection on unobservables, the models include a large number of control variables (Epifani, 2003; Segerstrom and Gustafsson, 2006; Bellack et al., 2008; Melitz and Ottaviano, 2008; Bridgeman, 2010; Covers, 2014; Levine and Warusawitharana, 2014; Waldkirch, 2014; Estrin and Uvalic, 2016).

A number of control variables are utilised which condition the results achieved and have been selected to reflect the findings in literature in relation to firm level performance. The fact that the research is comparing results obtained in 2005 and 2013 has limited the use of certain variables and, in consequence, variable selection varies between chapters and the models used. Additionally, the inclusion of an edited version of a published paper results in an extended variable list to reflect the specific research question for the Balkan region and the literature extant on the subject.

There was an assumption amongst economists that the privatisation programme undertaken by the Eastern European transition economies would result in a significant improvement in firm level performance.

Results have been more nuanced, with firms bought by foreign investors being significantly more productive than those in domestic ownership (Gabrisch and Hölscher, 2006; Wagner, 2012; Estrin et al., 2009; Irdam et al., 2015; Waldkirch, 2014).

Table 3.10 overleaf lists the variables utilised by each of the models employed in this thesis:

Table 3. 10 Variable Selection by Source with Description

Chapters 4 and 5[1]		
Variable name	**Variable description**	**Source**
Outcome variables both models		
Output per worker	Log of output per worker derived by dividing total sales by total full time equivalent employees	BEEPS[1]
Profit per worker	Log of profit per worker derived by dividing profit by total full time equivalent employees	BEEPS[1]
Independent variables		
EU Dummy	1 if the firm is in an EU member country 0 otherwise	BEEPS[1]
Foreign ownership	Defined as an investment of 10% or more in a local entity	BEEPS[1]
Private domestic	100% owned by indigenous owners with 1 representing	BEEPS[1]
Age	Firm age. Date established -2005 or 2013	BEEPS[1]
Exporting firm	Total export (direct + indirect) as a percentage of total sales	BEEPS[1]
Size	Categorical variables = 0 if a firm has less than five employees; = 1 if a firm has more than four and less than 20 employees; = 2 if a firm has between 20 and 99 employees; = 4 if a firm has more than 100 employees up to 7 when a firm has more than 1000.	BEEPS[1]
Loans	1 if the firm is in receipt of loans 0 otherwise	BEEPS[1]
Sector dummy	1 if manufacturing firm, 0 if services	BEEPS[1]
GDP growth	GDP growth per country as a %	WDI[2]
Inflation	Inflation rate per country in 2005 and 2013 calculated using a GDP deflator	WDI[2]
Bureaucracy	The added score of the perceived obstacles in the fields of customs, tax administration, business licencing and labour regulations[2]	BEEPS[1]
Infrastructure	As above in the fields of electricity supply, telecommunications and transport	BEEPS[1]
	Chapter 6	
EU Dummy	1 if the firm is in an EU member country 0 otherwise	BEEPS[1]
Foreign ownership	1 if the firm is foreign owned 0 otherwise	BEEPS
Private domestic	1 if the firm is domestically owned 0 otherwise	BEEPS
Exporting firm	Total export (direct + indirect) as a percentage of total sales	BEEPS
Age	Firm age. Date established -2005 or 2013	BEEPS
Size	Categorical variables = 0 if a firm has less than five employees; = 1 if a firm has more than four and less than 20 employees; = 2 if a firm has between 20 and 99 employees; = 4 if a firm has more than 100 employees up to 7 when a firm has more than 1000.	BEEPS
Loans	1 if the firm is in receipt of loans 0 otherwise	BEEPS
Capital (net assets)	Net asset value in US dollars.	BEEPS
Capital (replacement)	The cost of replacing current capital stock at 2013 values in US dollars.	BEEPS
Capital (rental)	The cost of renting land property and equipment in US dollars.	BEEPS
Cost per workers	The total cost of operations per worker in US dollars.	BEEPS
Skilled workers	The number of skilled production workers employed.	BEEPS
Competition	DV=1 if a firm reported that the number of its competitors was less than 15; zero otherwise.	BEEPS
R & D	Did the firm invest in R&D during the past year (0,1)	BEEP[1]
Infrastructure	The added score in the fields of electricity supply, telecommunications and transport	BEEPS
Bureaucracy	The added score of the perceived obstacles in the fields of customs, tax administration, business licencing and labour regulations[3]	BEEPS
Tech dummies (Low, mid, high)	Derived from BEEPS using ICIC codes. See below.	BEEPS
Service dummies (1,2,3,4)	Derived from BEEPS using ICIC codes.	BEEPS

Source: Author from Data Supplied by BEEPS 2005, 2013.

[1] In Chapter 5 utilising the QTE model institutional variables are omitted

[2] Perception of obstacles: 0= none, 1=minor, 2=moderate, 3= major, 4= severe

[3] Perception of obstacles: 0= none, 1=minor, 2=moderate, 3= major, 4= severe

Foreign ownership is a reflection of FDI, and evidence exists that it increased in the period before accession into the EU, peaking on the date of accession and declining slightly thereafter. EU new member states have proved an attractive FDI destination, particularly in relation to the comparative advantage offered by cheap skilled labour and the potential to include manufacturing firms in international production networks, however, there is evidence that the expected spillovers to local firms has not materialised. The opportunities provided by the burgeoning service sector has also proved attractive, with foreign firms seeing opportunities to take advantage of their superior managerial and technological skills to gain market share (Krugman, 1979; Epifani, 2003; Estrin et al., 2009; Gustafsson and Segerstrom, 2011; Estrin and Uvalic, 2016; Okafor and Webster, 2015). Therefore, foreign and domestic ownership has been included in the list of control variables to determine the influence of FDI and to discern whether there is any evidence of spillover effects.

Export is included because there is a body of evidence that indicates that exporters are more productive than non-exporters, with the probability that exporting increases, the higher the level of productivity and the more skilled the work force. Additionally, larger firms were more likely to export suggesting that economies of scale are also a factor. Exporters grow faster and perform better than non-exporters. This suggests that there is a selection process, which might result in a causality paradox as to whether firms become more productive when they export or become exporters because they are more productive (Beck et al. 2006, Wagner 2012). Exporting is an important consideration in the NMS because of the importance of the manufacturing sector to international production networks and the rise of the service sector, which has become a major exporter to the EU15.

The Washington Consensus programme sought to provide developing economies with the benefits of scale economics by learning by doing and theoretically providing the opportunity for technological spillovers from larger more sophisticated countries (Gereffi 2014). In the sample, 23.7% of all firms export in 2005 and 21% in 2013.

Firm size is controlled, as economies of scale are an important aspect of firm level performance and size is a critical ingredient. Additionally, evidence exists that financial and institutional development have a significant influence on firm growth, with size being influential in access to finance; smaller firms having a greater

propensity to be adversely constrained by obstacles to acquiring finance, but show improvement when these obstacles are reduced (Krugman, 1979; Beck et al., 2005; Beck et al 2008). There is some evidence that smaller firms are more likely to exhibit performance improvement over the medium term, whereas larger firms may show more resistance to change and can therefore exhibit a slower rate, being less constrained by financial and institutional obstacles (D'Souza et al 2014; Aussenegg and Jelic, 2007;; Beck et al., 2005; Schiffer and Weder, 2001; Villalonga, 2000).

Firm age has an influence on firm size and performance. There is evidence that firms improve with age and achieve higher levels of productivity and profitability, although this trend is usually associated with increased size. They can also display deteriorating trends, with reduced performance and a propensity to become smaller. Given the heterogeneity of firms, this is unsurprising but is nevertheless an important factor in relation to firm productivity (Coad et al., 2013). Older firms may have more entrenched stakeholders who are more resistant to the changes and restructuring brought about by privatization. Evans (1987) and Dunne et al. (1988) find that younger firms grow faster than older firms. Beck et al. (2006) find that older firms experience less growth constraints. Therefore, firm age is controlled for, measured by subtracting the firm's founding year from the survey year.

The inclusion of loans is predicated on the evidence in literature that firms in receipt of finance are more productive, develop more quickly and have an improved chance of survival (Levine 2005). However, within the transitional economies, firms report obstacles to obtaining finance.

Some commentators claim that the domination of the financial system by foreign banks has brought with it increased reliance on sophisticated credit scoring and the requirement for collateral (Estrin and Uvalic, 2016). The EBRD 2016 transition report believes that progress is being retarded as a result of financial imbalances, credit constraint and that the misallocation of capital may be an additional problem (Gopinath et al 2015).

The additional variables use in Chapters four (IPWRA model) and six (Western Balkans) are designed to reduce any problem of matching on unobservables relating to firm heterogeneity and have been selected on the basis of literature relating to

productivity and profitability. The use of the multi value IPWRA matching model not only provides an opportunity to evaluate the interaction between EU membership and key determinants of firm level performance, but also as a robustness check for any endogeneity problem associated with selection bias (D'Souza 2017). The additional variables included are cost per worker, skilled labour, competition and research and development (innovation). Additionally, the opportunity arises to look specifically at the effect of balance sheet, replacement and rental capital in the disaggregated manufacturing sample in Chapter six (Western Balkans).

The EBRD Transition Report for 2014 focuses on innovation as a driver of productivity but recognises that capital intensity (capital per worker), proximity to the main business centre (infrastructure), skilled labour, competition, and foreign ownership are also important determinants. Additionally, firms trading nationally or internationally are more productive than firms primarily targeting local markets (EBRD 2014). Literature also reveals that a more competitive market results in improved productivity (Bridgeman 2010). Clearly, membership of the EU significantly increases the competitive environment. Within the transitional economies there were concerns about the development of competition policy, although these have been largely allayed (Gabrisch and Hölscher 2006). Within the new member states there is evidence that "a well-designed and well implemented competition policy has a significant impact on TFP growth" (Buccirossi et al. 2013, p.1334).

In his literature review, Tybout (2003) concludes that foreign competition causes price cost mark-ups to fall and locally based firms to contract or even exit the market. International trade allows larger, more productive firms to expand their market base, thus creating greater efficiency, while exporters increase in size, are more efficient, and supply better quality products. Hence, unfettered access to the EU 15 developed market economies, allied to increased competition because of imports from the same source, conforms to Tybout's findings and new trade theory. Thus, competition is included as an independent variable.

However, a combination of labour market rigidity, incomplete reform programmes, a strong social welfare net, and migration of skilled workers have raised wages in relation to productivity, particularly in non-EU member states (Kovtun et al. 2014). It is assumed that the greater the skill base the more productive the firm and, evidence

suggests, the greater the proportion of highly skilled workers the more positive the result for labour productivity and profit. A more comprehensive review of Western Balkan competitiveness and productivity constraints emphasises the necessary improvements required in infrastructure and institutional development (Gabrisch et al. 2016; Bartlett 2013). These additional determinants have an influence on the productive environment and are therefore legitimate additional covariates to EU membership and loans, which are the treatment variables in chapter six.

Borocz (2012) claims that Hungary has failed to capitalise on EU membership due to the dominance of EU capital in assembly plant manufacturing, resulting in high import content in relation to exports allied to labour market failure. The unrelenting claims of supra-national institutions and the tendency amongst economists to accept the neoliberal agenda as a given, drown out the discordant views of dissenting voices. The influence of capital accumulation is critical, since it will both improve labour productivity and reduce the technology gap (Filippetti and Peyrache 2013). It is therefore important to control for capital in relation to the measurement of productivity, and since BEEPS allows for the disaggregation of capital into 'balance sheet', 'replacement', and 'rental' (leasing), it enables an analysis of the significance of each of these variables on the outcome.

In the QTE models, control for industry and macroeconomic effects utilise data from BEEPS and the World Bank with sector dummies (manufacturing and services) for the former and GDP growth and inflation for the latter. Institutional variables from the World Bank were included but rejected because they were highly correlated with EU membership which encapsulates, within the *Acquis Communautaire*, all the institutional effects. Therefore, in order to maintain the exogenous nature of EU membership, a prerequisite of the model, individual institutional variables have been omitted from the models. In relation to the IPWRA model and the Balkans chapter, the institutional influence is controlled by using bureaucratic and infrastructure effects. The disaggregated sectors use high, medium and low technology sectors to control for manufacturing industry heterogeneity and services by reference to the type of activity. All are designated by reference to the International Standard Industrial Classification of All Economic Activities (ISIC) as follows:

Low Tech 11-23 (Food, textile, wood manufacturing and printing)

High Tech 24 – 26 (Chemicals, plastics, pharmaceuticals, technological products)

Mid Tech – 27-36 (Primary manufacturing in iron, steel, metals)

Service 4 37 – 45 (Utilities, construction, wholesale)

Service 3 50 – 55 (Retail, catering, rail transport)

Service 2 60 – 66 (Other transport, storage and warehousing, communications)

Service 1 70-93 (Financial intermediation, real estate, business services)

Table 3.11 below shows the number of observations per key variable and sector covered in both 2005 and 2013. The list has been restricted to those variables selected for the multi valued estimator in Chapter 5.

Table 3. 11 Observations by Sector and Key Variable

Observations per Key Variables and Sector				
	2005		2013	
Variables and Sectors	Obs	%	Obs	%
EU membership	2444	36.7	2945	27.0
Foreign ownership	765	11.5	808	7.4
Private ownership	5722	85.9	9880	91.5
State ownership	685	10.3	223	2.0
Loan receipt	2854	42.8	3833	35.1
Exporters	1550	23.3	2266	20.8
Research & Development	791	11.9	1181	10.8
Manufacturing	2727	40.9	4246	38.9
Services	3934	59.0	6665	61.1
Total Observations	6661		10911	

Source: Author derived from BEEPS 2005 and 2013

It will be noted that the percentage of firms surveyed within European member states has reduced from 36.7% in 2005 to 27% in 2013, despite the inclusion of three further countries. However, the increase in total observations allows the claim that the sample size is sufficient to establish statistical significance. Private ownership now dominates the sample with evidence of increasing privatisation demonstrated by the reduction of state ownership from 10.3% to less than 2%, whilst foreign ownership is reduced from 11.5% to 7.4%. Other key variables have maintained their sample ratios and the number of observations provides reassurance that the econometric modelling will yield statistically significant results. Within the sector samples, services have increased the

share of the total and this reflects the growing importance of the sector within the Eastern European economies.

Private firms form 85.9% of the 2005 sample and 95.4% in 2013, illustrating the continuing privatisation programme throughout Eastern Europe. A number of these firms have been privatised but there are also de novo enterprises within a heterogeneous mix of companies. The literature on private firms and their age and size is contradictory. Findings range from larger older firms being more successful, to smaller younger firms being more flexible, innovative and productive ((Coad et al., 2012, Evans 1987 and Dunne et al. 1988, Beck et al. 2006).

Privately owned firms are therefore added to the explanatory variables to reflect their potential influence on productivity and profitability. Having established the influence of these variables, the research seeks to identify the key characteristics of firms that are more productive and profitable as a result of EU membership and other key determinants.

The IPWRA model in chapter four introduces the first treatment estimator which compares the productivity performance of firms within and outside the EU disaggregated to measure separately the manufacturing and service sector. It also provides for the introduction of a further four treatment variables, which allow the measurement of both absolute and relative effects, estimating the combination of each treatment pair and providing an opportunity to compare the efficaciousness of each pair on firms both within and outside the EU, separately for both manufacturing and services. The QTE model, which is a further treatment estimator provides a further dimension by changing the reference point from mean to median and measuring the effect of conditional variables on the dependent variables productivity and profitability across their distribution curves. This provides a richer vein of data and the use of the median addresses some of the heterogeneity concerns surrounding the use of the mean. To some degree, the Balkans chapter stands alone, with the choice of variables predicated on the specialist literature covering the area.

The QTE model also provides a robustness check to IPWRA estimator and adds a further dimension to the effect of EU membership across the productivity and profitability distribution curves.

3.8 Descriptive Statistics

Descriptive statistics are included at Appendix 1. In 2005 the productivity mean measured in log form is 9.9 in the full sample with little difference across the sectors. The range between the minimum and maximum however is significant at 1.6 to 16.4 but the standard deviation suggests a normal distribution. Higher minimum scores are seen in manufacturing but as one would anticipate the higher maximum figure is seen in the service sector. In relation to EU membership 37% of the sample are member firms. The mean of % exporters is relatively low with a high standard deviation indicating a great deal of heterogeneity in the sample. The mean figure is higher at 14.5 in the manufacturing sector than within services where it stands at 4.5 with the former showing the highest element of standard deviation. Foreign ownership is higher in the manufacturing sector with the standard deviation in both sectors being high. The average age of firms across both sectors is similar at 16 years for manufacturing and 14 for services. This may indicate a higher proportion of de novo firms entering the latter. The average size of firms ranging from a minimum of zero (less than 5 employees to a maximum of 7 (over 1000 employees) indicates the heterogeneity in relation to firm size. The average size of firm is between 20 and 99 employees indicating that the sample is skewed towards small medium sized enterprises. Domestic ownership has a comparatively low score indicating that the sample is skewed towards single owners, partnership and cooperative as opposed to fully listed companies. Research and development measured as participation or not has a small sample of less than 1000 as is evidenced by the mean score with manufacturing showing the greatest degree of participation. The institutional variables of bureaucracy and infrastructure show a relatively high indication of obstacles to business. Loan participation is low across all sectors at a mean of 43.5%.

In 2013 productivity is marginally higher across the sectors whilst the sample of firms in membership is lower. Exporting is broadly similar but foreign ownership participation is smaller. The average age of firm has reduced indicating the participation of more de novo companies. Firm size is on average smaller and domestic ownership and research and development participation are broadly similar. The institutional variable scores are significantly lower indicating a lower perception of institutional obstacles to growth but loan participation is lower possibly indicating

continuing market failure. The correlation matrices in 2005 and 2013 show no correlated variables above 50%

3.9 Conclusion

The survey data available for 2005 and 2013 provides accounting data, which allows the analysis of firm performance from the perspective of both productivity and profitability whilst simultaneously providing empirically usable data on key issues relating to the business environment. The data sources are the World Bank and European Bank for Reconstruction and development, which also provides a comprehensive brief on the questionnaire, methodology and the economic, social, geographical and political background of the countries being researched.

The transition reports published annually by the EBRD are an invaluable commentary on the results obtained in the BEEPS survey and provide useful topics to be further investigated by reference to literature. They also provide useful reference points in relation to the development of research questions.

The institutional variables provided by the WDI and WGI, together with Transparency International, indicate that the region overall lags behind the EU15 and by 2013 shows scant evidence of achieving any degree of meaningful convergence in terms of macroeconomic or institutional development. Additionally, the Corruption Perception Index suggests that the region overall is more corrupt than the EU15 or the developed countries in the OECD list of developed economies. The CIS is growing more quickly that both the SEE and the new member states of the EU, albeit from a lower base. The economic and institutional development of the SEE indicates a lack of readiness to be considered for EU membership, particularly given the apparent reluctance of their nearest neighbours, Bulgaria and Romania, to tackle corruption which is impeding their economic development. The EU states have three times the per capita GDP of the other two regions, whilst the SEE trails the CIS by 19%.

The data will allow a meaningful research project to be conducted, which can include firm level performance, responses to obstacles to doing business, issues relating to corruption, and commentary on the macroeconomic and institutional development issues retarding business development. The descriptive statistics from the World Bank and Transparency International, although not included as variables within the

empirical chapters, nevertheless provide valuable additional data which underpins the econometric analyses.

Chapter 4 – Firm productivity in transition countries: evidence from Inverse Probability Weighted Regression Adjustment (IPWRA)

4.1 Introduction

The Washington Consensus (WC) programme was applied universally throughout the transitional countries of Eastern and South Eastern European and Central Asian countries. However, the key is how and to what extent it was applied. The WC programme was originally recommended as a policy package to South American economies suffering from the economic shock of oil price increases and the failure of the hitherto successful import substitution industrialisation policy. This supply side initiative failed primarily because capacity outstripped domestic demand and the high tariff regime, which had supported the process, led to reciprocal tariffs thus preventing any exports of spare capacity. The subsequent economic collapse led to World Bank and IMF bailouts, conditional on adopting the shock therapy of the WC programme.

The fall of the Berlin Wall and the subsequent collapse of the Soviet Union and consequent freedom accorded to its client and satellite states, led to the disintegration of the old command economy. The Western world was dominated by the neoliberal ideology of the Reagan and Thatcher era epitomised by the term the WC. The belief was that the superiority of the Western capital system had been proven and therefore its adoption by the transition economies was a prerequisite for socio economic success (Gabrisch and Hölscher 2006). There were two players in the process, the constructivists, believers in the shock therapy of rapid privatisation, price and trade liberalisation, and the Popperians who believed in gradualism and a slow transition with the establishment of a strong institutional base as a prerequisite of further progress (Ellman et al. 1993, Kokushkin 2011). The neoliberal thought collective ensured that political and economic policy, supported by many in academic circles, dominated the initial implementation process throughout the transitional economies, albeit that the shock therapy programme was not universally implemented with national governments picking and choosing which elements to adopt (Gabrisch and Hölscher 2006).

However, there was one group that was coerced into adopting the prescription in its entirety, namely the New Member States (NMS) of the European Union (EU). The

conditionality of accession meant that the states had to adopt both the Acqui Communautaire and the neoliberal paradigm of the Washington Consensus programme as internalised by the EU (Fitoussi and Saraceno 2013).

The WC programme has long been criticised by a number of scholars as being the cause of the South American economic collapse in the eighties, the East Asian financial crisis of the nineties and the severe economic problems experienced by the transitional economies. In relation to the latter, the opportunity exists to compare one group that bore the full gamut of the programme, namely the NMS, with a further group, primarily the former Soviet Union, but with other satellite states over which it held hegemony. This research is based on firm level performance, since productivity is the key to economic growth, and if firms are productive, by definition, the state should display signs of growth.

This chapter begins the process by evaluating the productivity of EU member and non-member firms to establish whether there is any clear advantage for the group in which the WC programme was implemented in its entirety. This is established by measuring some of the tenets of the WC programme, namely, access to finance, free flow of funds, trade liberalisation and the promotion of innovation. There are two research imperatives; to fill the microeconomic research gap as to the efficacy of the WC programme, in the context of a controlled experiment where there is a treatment effect (EU membership) against a control group and, to explore these effects against a background of the emerging transitional economies of Eastern Europe and Central Asia.

To achieve this a matching model is utilised, which evaluates the effect of one or more treatments and compares the treated and untreated cohorts. This is approached in a quasi- experimental context as the treatment is not randomly assigned. The objective of matching is to identify treated and non-treated units with similar observable characteristics against which the effect of the treatment can be assessed. The purpose of matching is to ensure that the treated and untreated samples are similar in every respect to eliminate bias due to confounding. This chapter discusses the results of a particular outcome namely, (output per worker), and compares two sets of matched firms with similar characteristics, namely firms within the NMS of the EU and those outside.

The Inverse Probability Weighted Regression Adjustment Model (IPWRA) is used to compute the potential outcome means (POM). This model combines regression adjustment and an inverse probability weighted estimator, where the former uses the means of predicted outcomes for each treatment level to estimate both POMs, and the latter uses weighting to inflate the weight for subjects which are under-represented. The POM is the result of the application, or lack of application, of a treatment on treated and untreated groups similar in every other respect. This methodology has the advantage of being doubly robust, where only one of the two models utilised has to be properly specified. In other words, the propensity score model, or the postulated regression model, can be incorrect but still produce a consistent estimate of the treatment effect. The model has the added advantage of being able to compute more than one treatment effect simultaneously. This allows the addition of what could be described as an interaction effect, where EU membership and non-membership can be measured alongside additional treatments, namely, receipt of loans, foreign ownership, export propensity and research and development. These variables have been selected due to evidence that each contributes to firm growth (see Epstein and Jacoby 2014 for EU membership; Levine 2005 for access to finance; Waldkirch 2014 for foreign ownership (FDI); Wagner 2012 for exports; Grilisches 1979 and Warusawitharana 2015 for research and development). Each treatment effect is measured individually and in conjunction with EU membership (multi valued treatment) as illustrated below.

This chapter provides a direct comparison between the productive efficiency of firms within the EU as opposed to those outside, together with disaggregated results for the manufacturing and service sectors in both 2005 and 2013. This allows an analysis of the effect of membership to discern whether any differences exist between the two years: 2005 being one year following the accession of eight of the eleven NMS, and 2013 providing a perspective following a period when a degree of stability had been reached.

4.2 Inverse Probability Weighted Regression Adjustment Model

The use of matching to determine causal effects has become increasingly popular and can be applied across a wide range of academic disciplines. This thesis utilises the technique to determine the efficaciousness of EU membership against non-membership, with the added complexity of a multivalued approach where an additional

treatment is added to both the EU treated and the non-treated group. Questions of an empirical nature in economics increasingly measure the causal effects of programmes, policies and regimes and, in estimating the efficaciousness of these, treatment and control models are used which had their gestation in medical research, hence the nomenclature used. The use of such techniques has evolved over the past two decades and most of this work emanates from Rubin (1974) and has been described as the Rubin Causal Model (RCM), which is based on a counterfactual framework approach to measuring causation in observational data. The use of a matching model is useful when an answer is required to the question of what effect a treatment has on an individual or unit against another one which received none. One can only observe the outcome on the treated, the factual outcome; the counterfactual outcome is essentially unobserved and therefore presents an evaluation problem of missing data. Matching allows comparison of the factual and counterfactual by estimating the latter. Additionally, because the model identifies similar subjects amongst both treated and untreated groups, it reduces the problem of heterogeneity. Essentially the matching model seeks to identify, within a treated and control group, a sufficient sample size with similar characteristics, except for treatment, that there is a balance of conditional covariate characteristics between the two groups. This restricts the causal effect to whether treatment had been received or not (Wooldridge 2010).

The central feature of matching analysis is the relationship between a treatment variable and an outcome variable. In this study the treatment variable is EU membership. Additional treatments are taken from the receipt of a loan, foreign ownership, export and research and development. The outcome variable is a specific indicator of firm performance – productivity (output per worker).

A simple approach would be to compare a sample of firms within the EU with a sample of those outside, and to test whether there is a statistically significant difference in the performance of EU member firms against non-members. Regrettably, such an approach would almost certainly produce biased results, unless the treated and control groups closely resembled each other in all relevant attributes other than the treatment. Essentially, the difficulty is one of confoundedness, where unobserved variables influence the causal relationship beyond the treatment effect. It is therefore important that both treatment and control group are alike, any confounders measured, and

techniques utilised to ensure that the causal effect is limited to the treatment variable. The methodology employed is known as a matching approach, which seeks to replicate the process of experimental random sampling using non-experimental observed data. Detailed discussions of the matching methodology can be found in several sources, including Dehejia and Wahba (2002), Deheja (2005), Peikes, Moreno, and Orzol (2008), Leuven and Sianesi (2013). There are many studies involving economic applications, which also contain useful expositions of this methodology. These include Sianesi (2004) and Blundell et al (2005).

The matching approach focuses on three key parameters:

ATE – the average treatment effect in the population (defined as all treated and untreated firms when the latter population moves from untreated to treated).

ATT – the average treatment effect for treated firms (in this research those from countries who joined the EU in 2004, 2007 and 2013. i.e. those subjects who ultimately received the treatment.).

ATNT – the average treatment for those that were not treated (firms from non-EU member states and this is an estimate of the counterfactual).

These are defined as:

$$ATE = E(Y_{1i} - Y_{0i}) \equiv E(\beta_i) \quad (1)$$

$$ATT = E(Y_{1i} - Y_{0i}|D_i = 1) \equiv E(\beta_i|D_i{=}1) \quad (2)$$

$$ATNT = E(Y_{1i} - Y_{0i}|D_i = 0) \equiv E(\beta_i|D_i{=}0) \quad (3)$$

Where Y_{1i} is the outcome, with subscript 1 for those firms that are "treated" and Y_{0i} with subscript 0 for those that are not. D is an indicator of the treatment received (by definition, 1 for treated and 0 for non-treated).

The simplest (naïve) estimator of the effects of treatment (EU membership) on a particular outcome is to compare the means of the treated firms against those of the untreated. Such an approach is biased for two sets of reasons; bias from selection on observables (comparing firms that are not comparable or weighting comparable individuals differently) and bias from selection on unobservables.

The bias from unobservables is, in effect, a version of the problem of possible excluded confounding variables. As always there is no guarantee that an important confounding variable has been excluded, but steps can be taken to limit the possibility. A common approach, followed in this thesis, is to use a sufficient number of potentially relevant variables in selecting from observables. For example, to reduce the threat of bias, firm size, age, receipt of loans and exports are included.

Reducing bias from selection on observables is more involved. To estimate ATT, it is necessary to assume that all relevant differences are captured in the observed attributes of the treated and untreated firms (that is, no bias from selection on unobservables) and that both treated and untreated firms with shared attributes (common support) can be observed. Selection is performed using a propensity score p(x), where the propensity score is the equivalent of the predicted probability of treatment (D=1), which is derived from the fitted regression model:

$$p(x) \equiv P(D = 1|X = x) = E(D|X = x) \qquad (4)$$

A common approach is to use a probit or logit model to define the propensity score and, whilst not in itself a causal model, it acts as a way of identifying and summarising the key characteristics of the "treated" (EU membership) firms.

The next step is to use the propensity score for matching – to pair each "treated" (EU membership) firm with a comparable "untreated" (non-membership) firm.

There are significant different ways to conduct this matching process; the simplest and most common method being "nearest neighbour" matching. For each treated firm, the procedure selects the untreated firm with the closest value of the propensity score.

To attribute the estimated difference to a treatment assignment safely, treated firms must be similar to untreated in all respects, except for the treatment variable. This depends on two identifying assumptions. The conditional independence assumption (CIA), or selection on observables, posits that after controlling for these independent variables, the potential outcomes are independent of treatment status; for example the outcome in the case of no treatment (Y_0) is independent of treatment assignment (T), conditional on covariates X (Imbens, 2004; Imbens and Wooldridge, 2009). The overlap, or common support condition, implies that there is sufficient overlap in the

characteristics of the treated and untreated unit that the comparative matches are adequate for the purposes of the model (Heckman and Vytilacil, 2007).

There are a number of matching models, of which propensity score matching (PSM) is the most popular, and the standard methodology is the potential outcome approach of the treatment on the subject being measured. However, the use of propensity score was critiqued in a recent paper and found that it:

> *"increases imbalance, inefficiency and model dependence, research discretion, and statistical bias at some point in both real data and in data generated to meet the requirements of PSM theory. In fact, the more balanced the data, or the more balanced it becomes by pruning some observations through matching, the more likely PSM will degrade inferences — a problem we refer to as the PSM paradox. If one's data are so imbalanced that making valid causal inferences from it without heavy modelling assumptions is impossible, then the paradox we identify is avoidable and PSM will reduce imbalance but then the data are then not very useful for causal inference by any method" (King and Nielsen 2016 pp.1).*

This clearly poses a threat to the validity of the PSM approach and, whilst there are coping strategies developed in King and Nielsen's paper, there are more appropriate solutions that minimise the dangers described. It is accepted that if estimators of conditional means or propensity scores as parametric models are relied upon, it should be accepted that the model could be misspecified (King and Nielsen 2016).

However, a combination of regression adjustment and propensity score weighting can be used to bring a degree of robustness to the parametric model (Wooldridge 2010). IPWRA is one of a number of matching models available to the researcher for the estimation of the average treatment effect (ATE) and the average treatment effect on the treated (ATET) together with the potential outcome means, which correspond to the outcome when a unit is treated and when it is untreated. This model is a combination of a regression adjustment model (RA) and an inverse probability weighted (IPW) estimator. The RA estimators utilises separate regressions for the different treatments and then uses averages of the predicted outcomes to measure the

POMs; in the case of the subject of interest, ATET, the results are the averages of the predicted outcomes over the treated units. The IPW estimator uses weighted averages of the treatment outcome variable to estimate POMs. The weights are the inverse of the estimated probability that a unit receives a particular treatment. The outcomes of units likely to receive treatment are given a score close to 1 and those unlikely to be in receipt of treatment greater than 1. In the case of the former, the model predicts the outcome of the treatment, and for the latter, its treatment status.

The IPWRA model combines the outcome element of RA with the treatment status of the IPW estimator. Two models are built; a logistic regression model to predict treatment status and a linear regression model to predict outcomes. The RA estimator uses inverse probability weights for corrective purposes when the regression model is miss specified, but if correctly specified, the weights do not affect the estimated outcome. Hence, IPWRA has the advantage being doubly robust. If either the propensity score model (the outcome model) or the treatment model is correctly specified, the estimator will yield treatment effects with a lower bias than other estimators not characterized by the double-robustness property (Hirano et al., 2003).

Busso et al. (2014) conducted a Monte Carlo simulation of the finite sample properties of a range of matching and reweighting estimators – which include the IPWRA – in the estimation of ATTs. Their findings support the use of IPWRA. Firstly, normalised reweighting was used, which exhibits overt bias of the same magnitude as pair matching, but much smaller variance; secondly, normalised reweighting outperforms matching estimators when the overlap is good, which applies in this thesis (see Graphs in Appendices 1.1 to 1.24).

The IPWRA estimator consists of three steps. Firstly, for each unit in the sample, the treatment model estimates the propensity score, which is the probability for each unit of participation ("treatment assignment"). The propensity scores enable firms to be matched within each treatment level. Secondly, regressions are estimated by the fractional logit model, as the outcome variable is the inverse of the estimated propensity scores and is used as weights on covariates X and the treatment dummies. Thirdly, from each regression, the ATT effect is computed as the difference in the weighted averages of the predicted outcomes. Valid standard errors (of the Huber/White/sandwich type) are reported, which consider that the estimates are

computed in a three-step approach (Emsley et al., 2008). The coefficients in the models are not of interest in themselves, as the purpose of specifying the model is to facilitate the estimation of treatment effects (Cattaneo et al. 2013). As an illustration of how the estimator produces the potential outcome means Appendix 2 reports results for the model estimated for loans in 2005 for the full sample. Descriptive statistics are reported at Appendix 3.

The methodology described so far have covered binary treatment effects when each unit either receives treatment or does not. However, this research utilises a multi valued approach in which each unit could receive several treatments, or none. This allows an analysis of the absolute effect of one or more treatments against no treatment and the relative effect of one treatment against multiple treatments. Thus, a broader canvas is provided on which to evaluate the result since it provides information on an interaction of treatments although the regression is still controlled by conditional covariates and each treatment can be analysed separately and in conjunction with the other.

The research seeks to establish the effect of EU membership, with four additional treatment variables, and estimates the Average Treatment on the Treated (ATT) effect. Essentially, it follows the most common approach by matching, by means of propensity scores, EU member ("treated") firms to non-EU member ("untreated") firms with similar characteristics, thus constituting a comparison group. Subsequently it estimates the difference between output (productivity as the outcome of interest) (Y_1) for these firms, which includes the addition of a further treatment, against non-member firms (Y_0) (Cerulli, 2010). Treatment effects are estimated in the multi-treatment context to ensure that EU membership and non-membership are carried out simultaneously. A matching approach with multiple treatments was first introduced by Lechner (2001). There are D (EU membership) treatments plus 1 further treatment (receipt of loans, foreign ownership, export and innovation), whereby treatment equal to zero denotes the absence of the introduction of either EU membership or any additional treatment. The average treatment effect on the treated (ATT) effect is then calculated as:

$$ATT = E(Y^D|T = D) - Y^1|T = D) \quad (5)$$

Where D denotes the treatment level; l represents the comparison group (the treatment level to which D is compared), and Y^D and Y^1denote outcomes in states D and l respectively.

To estimate the individual and joint effects of EU membership and receipt of a further treatment on productivity and profit, the variable Treatment was created with the following values using receipt of loans as an example:

Treatment (T) =0 if a firm is not in EU and did not receive a loan

Treatment (T) =1 if a firm is in EU but did not receive a loan

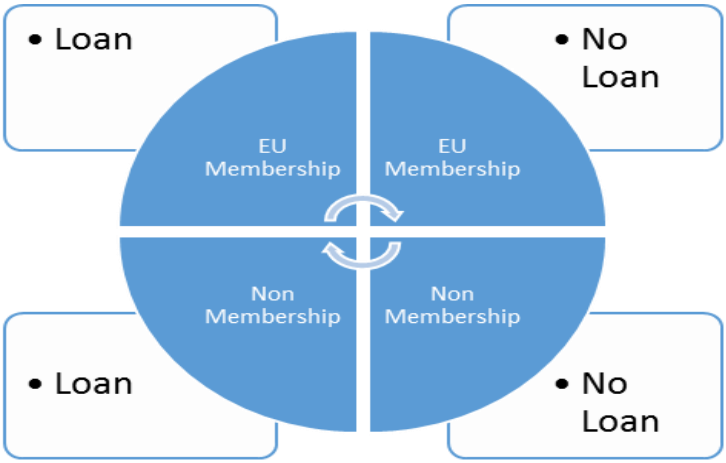
Treatment (T) =2 if a firm is not in EU but has received a loan

Treatment (T) =3 if a firm is in EU and has received a loan

For loans, substitute in turn foreign ownership, international trade and research and development.

In this instance the IPWRA estimates a multiple treatment effect and the propensity scores are estimated by a multinomial logit model, incorporating all four treatment levels: for example; no EU membership and no loan/ no EU membership with loan / EU membership and no loan / EU membership with loan. The choice of the model is motivated by the nature of the treatment variable, which has more than two outcomes, with no natural ordering. The propensity scores enable firms to be matched within each treatment level. The regressions are estimated by the fractional logit model, as the outcome variable is the inverse of the estimated propensity scores and is used as weights on covariates X and the treatment dummies. From each regression, the ATT effect is computed as the difference in the weighted averages of the predicted outcomes. Valid standard errors (of the Huber/White/sandwich type) are reported, which consider that the estimates are computed in a three-step approach (Emsley et al., 2008).

Figure 4. 1 Graphical Depiction-Membership, Non-Membership and Loans



Source: Author

4.3 Empirical Application

The IPWRA model has been adopted because it addresses the potential for bias in other models utilising propensity score matching models. Additionally, due to its doubly robust properties, it provides further reassurance in relation to any potential misspecification. It is used to provide a comprehensive picture of the effect of EU membership with the added advantage of combining with the four major themes of the thesis.

The multi valued approach does not detract from the ability of measuring each treatment effect singly, although it adds to the evaluation by providing what might be described as an interaction term with the main theme of EU membership. What is being measured is the effect on the firm in receipt of one or more treatments against a firm receiving none (absolute effects) and the effect when a firm receives one treatment against one which receives both (relative effects). The models measure the absolute effect on productivity (the outcome variable) of three groups with one or two treatment effects on a fourth untreated group (1v. 0, 2 v. 0, 3 v. 0). The relative effects measure groups with one treatment against groups with two treatments (1 v. 2, 3 v. 2 and 3 v. 1). To accompany EU membership, the additional treatment effects are receipt of loans, foreign ownership (FDI), exports and research and development (innovation); all predicated by reference to literature.

The outcome model, shown below, and the treatment models utilising the same conditional variables, are run separately; the former establishing the propensity score and the latter using a logit model and specifying the average treatment effect on the treated (ATET).

$$y_i = \beta_{x1i} + \delta_{x2i} + \theta_{x3i} + e_i \quad (6)$$

The outcome variable is y_i and the treatment variable is EU membership combined with either loan receipt or foreign ownership (FDI), exports or research and development (innovation). The vector of conditional variables are predicated by reference to literature and include loans, foreign ownership, exports and research and development, omitting a variable when it becomes a treatment. A vector of control variables δ_{x2i} firm age, firm size, bureaucracy and infrastructure are included with sector dummies θ_{x3i} representing industry sectors and technological intensity.

The choice of treatments is predicated by literature. Within Eastern Europe, there is evidence that firm growth has been adversely affected by lack of access to finance and the models in this chapter seek to estimate the effect of loans on productivity both within and outside the EU (Levine 2005; Volz 2011; Howard-Jones et al. 2018). In the case of the former, it is achieved by pairing receipt of loans with EU membership and for the latter, using the single treatment variable, which can be relatively compared with both treated and non-treated firms within and outside the EU.

The inclusion of foreign ownership results from extensive literature on the subject as FDI is one of the key determinants in Eastern European economic growth, particularly within the new member states (NMS) of the EU (Wagner 2012). The model is constructed in identical fashion to the loans model although, within the conditional variables, loans have been substituted for foreign ownership.

Exports are included since there is evidence in literature that exporters are more productive than non-exporters, many of whom become exporters as a result of their superior productivity performance. It is claimed that exporters may self-select towards a propensity for international trade (Greenaway and Kneller 2004). The models utilised use the same techniques as previously described, with exports eliminated from the list of conditional variables. The choice of research and development is a proxy for innovation, an important determinant of a successful firm, and there is evidence to

suggest that firms that do not innovate, face underperformance or market exit (Pratali, 2003; Ramadani, Gërguri, Rexhepi, & Abduli, 2013; Tse, Esposito, & Soufani, 2015; Ratten, 2015; Wilkinson & Thomas, 2014). A comparison of the performance of firms which innovate against those that do not, provides some insight into the relevance of innovation as a measure of firm level performance.

The computed results will allow analysis of the comparative impact on firm level productivity of each of the treatment variables, both singly and in interaction, with the expectation that the firms in the NMS will outperform their non-member peer group due to the developed nature of institutions, an enlarged market for goods, increased FDI and competition. It is also anticipated that, notwithstanding membership, the additional treatment variables of loans, foreign ownership, exports and innovation will increase productivity in both member and non-member firms. The absolute results will be shown as a percentage increase or of no significance against the control group of firms not in membership and not in receipt of a treatment.

The relative results will be a similar comparison but against each untreated group regardless of EU membership. The results will be compared over two time periods, 2005 and 2013.

4.4 Analytical Focus

The discussion in relation to the IPWRA results is centred on three tables comparing the results for 2005 and 2013 and evaluating the full sample of firm level observations, which are then disaggregated to the service and manufacturing sectors. The analysis covers both the absolute and relative effects of the comparison of labour productivity performance between firms within the EU and those outside, using output per worker as the dependent variable. A multi-valued approach is used where EU membership is combined, separately, with loans, foreign ownership, international trade and research and development. In addition to the comparison between member and non-member firms, a separate comparison is made between member firms receiving the additional variable treatment against those that do not. An identical analysis is made for non-member firms. Thus, the effect of EU membership alone is measured together with the effect of an additional treatment variable and its influence on firms in non-member states. This provides the opportunity to discuss the advantages of membership

(institutional development) and separately, the influence of the additional treatment variable both within and outside the EU; the objective being to record whether firms from similar economic, sociological, political and cultural backgrounds react differently when introduced to both membership and an additional treatment variable.

For ease of observation, only the percentage increase between the treated and untreated is shown. The full tables, including coefficient values, can be seen at Appendices 4a to 4h. The majority of the results are at the 99% confidence interval, therefore any exception will be reported separately and a lack of significance highlighted. Each table will be presented at the beginning of the section with a summary of the results prior to a more detailed analysis.

4.5 Comparison of Absolute and Relative Effects in the Full Sample of EU Membership and Selected Treatment Variables

Table 4.1 below compares the various combinations of comparative data available for analysis. It shows consistently that, in absolute terms, EU membership is the key variable in relation to productivity, with firms in the member states outperforming those outside. Generally, when other treatments are added, they tend to add to the advantage. The picture is similar in relative terms, albeit that the advantage dissipates in 2013 when a treatment effect is added to non-member firms. Treatment effects provide a productive advantage in non-member firms.

Table 4. 1 Absolute and Relative Effects - Full Sample

ABSOLUTE EFFECTS						
Full Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
Columns	**1**	**2**	**3**	**4**	**5**	**6**
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
Loans						
ATT (in percentages) Output	0.109*** (0.005)	0.048*** (0.006)	0.041*** (0.004)	0.047*** (0.005)	0.146*** (0.005)	0.072*** (0.006)
Foreign Ownership						
ATT (in percentages) Output	0.124*** (0.003)	0.042*** (0.004)	0.025*** (0.006)	0.027** (0.014)	0.156*** (0.006)	0.060*** (0.012)
Exports						
ATT (in percentages) Output	0.116*** (0.004)	0.044*** (0.004)	0.050*** (0.006)	0.057*** (0.008)	0.138*** (0.007)	0.070*** (0.006)
Research and Development						
ATT (in percentages) Output	0.124*** (0.003)	0.046*** (0.005)	0.043*** (0.006)	0.057*** (0.008)	0.168*** (0.007)	0.080*** (0.009)
RELATIVE EFFECTS						
	1 vs 2		**3 vs 2**		**3 vs 1**	
Loans						
ATT (in percentages) Output	0.069*** (0.007)	0.001 (0.007)	0.103*** (0.005)	0.025*** (0.006)	0.023*** (0.003)	0.027*** (0.005)
Foreign Ownership						
ATT (in percentages) Output	0.084*** (0.008)	0.018 (0.011)	0.134*** (0.009)	0.053*** (0.018)	0.020*** (0.006)	0.054*** (0.009)
Exports						
ATT (in percentages) Output	0.048*** (0.007)	-0.010 (0.010)	0.080*** (0.007)	0.017** (0.008)	0.024** (0.011)	0.022*** (0.007)
Research and Development						
ATT (in percentages) Output	0.090*** (0.007)	-0.000 (0.009)	0.120*** (0.007)	0.020* (0.012)	0.027*** (0.006)	0.031*** (0.007)

Source: Author form BEEPS 2005 and 2013

4.5.1 EU membership and Loans

In 2005, EU member firms without loans are 10.9% more productive than their non-member counterparts, increasing to 14.6% when a loan is included. The influence of a loan on non-member state firms is clear, with a productivity improvement of 4.1%, indicating that loans are a key ingredient in both member and non-member states although within the EU, membership is the most important influence with the highest coefficient value. This would suggest the key influence on firms within the NMS is institutional development, which both supports and encourages market liberalisation. The effect of loans in both member and non-member states is 4.6% and 4.1% respectively, indicating that there is a uniform effect regardless of membership and the socio economic and political environment, there is a universality about the importance of access to finance throughout the transition economies.

In 2013, the productivity gap reduced to 4.8% for membership alone and 7.2% when loans are included. For non-member firms with loans, the productivity advantage shows a marginal improvement to 4.7%. Given that the ratio of loan advantage has

remained similar in all cases, this would suggest that loans have continued to be significant over the 8-year period, and convergence has resulted from either an improvement in labour productivity amongst non-member firms, or a diminution amongst member firms. Ospina and Schiffbauer (2010) found that increased competition, supported by product-market reforms, increased productivity by circa 12 to 15 percent, which chimes with the results seen in 2005.

The results in 2013 are more likely to indicate stability in non-member states and a slowing down of productivity improvements in the NMS as firms get closer to the production frontier, together with difficulties of access to finance possibly retarding performance improvements.

In relation to loans, the results appear to justify claims by Levine (2005) that there is a strong theoretical foundation between finance, economic growth and productivity improvements, which Volz (2010) suggests applies specifically to countries in transition. Volz also concludes that the presence of state-owned and foreign owned banks creates restrictions to access to finance amongst SMEs.

In the BEEPS surveys, in excess of 80% of the sample are SMEs and therefore any restrictions to accessing finance will hinder their development. Also, work by Levine and Warusawitharana (2016) indicates that increased financial frictions have a deleterious effect on productivity. After the 2008 financial crisis these frictions increased, possibly explaining, in part, the convergence in productivity performance, given the subsequent Eurozone crisis, which may have impacted EU member states more profoundly that their Eastern European counterparts. Additionally, the consistent productivity advantage for firms in non-member states between 2005 and 2013, would indicate that access to finance has not improved in the intervening years, otherwise there would have been an increase in productive advantage as a result of increased market liquidity.

The relative results indicate that, in 2005, in the full sample, member firms without loans were 6.9% more productive than non-member firms with loans, indicating that even when finance is available outside the EU, membership still has a productivity advantage, further confirming that the institutional environment created by the *Acquis Communautaire* is a key component in improving productivity. This is achieved by

developing a competitive market, supported by free flow of funds encouraging FDI and a service sector capable of underpinning a market economy. However, the result is not statistically significant in 2013, indicating that any institutional advantage had dissipated. This may be because well financed firms in non-member states were as productive as those in the EU without loans, although given the heterogeneity of the sample and other factors such as the financial crisis reducing liquidity, this can only be supposition.

When the comparison is between firms with loans within and outside the EU, the advantage grows to 10.3% 2005 diminishing to 2.5% in 2013. This supports the suggestion that firms in non-member states had achieved a degree of convergence, indicating that the period immediately post accession provided the greatest boost to member firms, which coincides with FDI peaking in the year of accession. When member firms with and without loans are compared, the recipients have a 2.3% and a 2.7% advantage in 2005 and 2013 respectively, indicating the efficacy of loan receipts in both periods.

4.5.2 Foreign Ownership

The results for EU membership and foreign ownership continues to indicate that membership is the greatest influence on firm level productivity with a 12.4% advantage over non-member firms. When firms are foreign owned, the advantage increases to 15.6%. This finding conforms to literature, indicating that FDI introduces increased competition and managerial and technological improvements to locally acquired firms, which is particularly true of the transitional economies of Eastern Europe (Bijsterbosch and Kolasa 2010). However, as with loans, the advantage diminishes over time, reducing in 2013, to 4.2% and 6% respectively. A comparison of foreign and domestically owned firms outside the EU, yields a much smaller advantage at 2.5% in 2005 and 2.7% in 2013, indicating that the presence of FDI outside the NMS, is less influential.

In 2005, a comparison of foreign owned firms outside the EU with those domestically owned member firms, reveals that they are 8.4% more productive although, as with the loans result, the outcome is statistically not significant in 2013. This indicates that in 2005, foreign investors in non- EU member states were not achieving the traction

enjoyed by domestic firms within the EU and that a greater degree of market liberalisation, increased competition and a stronger institutional base is more important that the technological benefits accorded by FDI. This conclusion is supported by the results when firms within and outside the EU under foreign ownership are compared. When member firms are foreign owned, they are 13.4% more productive than their non-member peer group, although this converges to 5.3% in 2013.

This may be a reflection of the reduction in FDI flows following the financial crises, which resonates with Smith and Swain (2010, p. 21) who put forward a similar argument by claiming that "high levels of international economic openness created vulnerability to economic decline in core markets during the economic crisis". Equally, an improvement in national innovation capacity, together with absorptive capacity in the non-member states leading to improvements in productive efficiency, could also contribute towards convergence (Furman et al 2003). In 2005, foreign owned firms within the EU are 2% more productive than those in domestic ownership, rising to 5.4% in 2013, indicating that structural, managerial and technological forces improve firm efficiency over time (Bijsterbosch and Kolasa 2010). This could also be a reflection of the lack of spillovers to domestic firms, particularly from MNEs involved in vertical investments.

The dynamics of the foreign ownership result may well be different from loans as FDI peaked on the date of accession and declined thereafter. This suggests that there may have been an accelerated productivity improvement effect leading up to 2004 (Howard-Jones et al 2017). It is also evident from the marginal productivity improvement effect of foreign ownership, which remained static between 2005 and 2013, that FDI is less effective for firms outside the EU. This may well be the result of greater institutional development within the new member states, creating a positive dynamic, which emphasises the accrued benefits. Additionally, the influx of foreign owned banks will have improved the financial intermediation environment within the EU, at least for foreign owned firms (Beck et al. 2005; Djalilov and Hölscher 2016) although the Eurozone crisis would have had a negative effect on both FDI and the performance of foreign owned firms by 2013.

4.5.3 Exports

In relation to exports in 2005, a full sample of EU member firms are 11.6% more productive than their non-member peer group and this advantage increases to 13.8% for exporting firms. In 2013, the advantage reduces to 4.4% and 7% respectively. Of note is that outside the EU, exporter advantage over non-exporters has been maintained at 5% and 5.7% respectively. This is a higher productivity premium than that seen in firms within the NMS and may reflect the dominant role of foreign owners in the NMS export market, where firm performance indicators have the potential to be distorted by transnational inputs, transfer pricing protocols and foreign currency exchange issues. A further factor is the nature of exports from the former Soviet Union, which are predominantly geared towards the extractive industries, where the high price of the refined product provides a boost to productivity when measured as output per worker. This confirms that exporting firms are more productive than non-exporting firms; a conclusion supported in literature (see Girma et al 2004; Greenaway and Kneller 2007; Wagner 2012). However, the export premium enjoyed by member firms remains static at between 2% and 2.5%.

The relative results indicate that in 2005 EU member firms are 4.8% more productive than exporting non-members; the result becoming not statistically significant in 2013. There is evidence that the most productive firms self-select as exporters (Melitz 2003; Beck et al. 2005). On the assumption that these firms are amongst the most productive, this implies that EU membership provides positive productive advantages to firms who do not export and are not, by definition, amongst the most productive. It is therefore apparent that the less productive firms in the EU are more productive than those at the top of the productivity distribution curve in non-member states and, given the high intensity of FDI into the NMS, these firms are more capital intensive than the non-member exporters (Hunya 1997). The results for 2013 being not statistically significant, suggest that productivity convergence has occurred in the intervening years. This assertion appears justified when observing the results for foreign owned firms both within and outside the EU. In 2005, exporters within the EU have an 8% advantage over their non-member peer group, with the differential converging to 1.7% (95% confidence interval (C.I) in 2013. This may be the result of the Eurozone crisis, as the reduction in demand in the EU15 impacted upon exporters in the NMS, allied

to the possibility that extractive industry biased exporting from non- member states, contributing to convergence (Kronenberg 2004).

Within the EU, in 2005, exporters have a 2.4% (95% C.I) advantage over non-exporters, reducing marginally to 2.2% in 2013. The consistency of this result over time suggests that the export productivity premium is not as significant within the NMS as evidence in literature suggests.

This may be a function of the type of exports within a more competitive market; cheaper labour-intensive products from the most productive firms who have continued to export but in the light of increased competition have been forced to reduce prices. Alternatively, the major exporting countries, with many foreign owned firms trading within the IPNs, are dealing with a significant level of imported inputs leading to a limited ability to create added value. In both cases, the result is pressure on price cost margins. Given that the dependent variable is output per worker, any pressure on price will reduce output per worker, which may give a distorted result with a different outcome if total factor productivity is used (Borocz 2012). There is also evidence that there are no export premia for intra- European trade (Bellone et al. 2010).

4.5.4 Research and Development

In 2005, firms within the EU are 12.4% more productive than their non-member peer group, increasing to 16.8% amongst innovators. In 2013, as in other results, there is evidence of convergence with non-member firms as the advantage reduced to 4.6% and 8% respectively. This confirms that EU membership is the key driver of the productivity advantage with innovation extending that by 4.4%. Amongst non-member state firms in 2005, innovators are 4.3% more productive than non-innovators, rising to 5.7% in 2013 revealing the importance of innovation in relation to productivity for all firms surveyed, although confirming that innovators within the EU have the additional advantage of membership. It further suggests that the collapse of the old Soviet style state run research and development system has been replaced by an effective alternative that seems to be producing results.

The relative results indicate that firms within the EU are 9% more productive than innovative non-member firms, although this figure becomes not statistically significant in 2013. The result is a further indication that, in 2005, EU membership,

with the conditionality of the Acqui Communautaire as the price of accession, is key to the productivity improvements achieved by firms. When innovators in both regions are compared, EU member firms are 12% more productive again becoming not significant in 2013.

This result appears to justify the assertion made earlier in relation to convergence, that in 2005 there appears to be a circa 3% advantage to innovators when the membership effect is removed and, on the assumption that this has dissipated by 2013, the innovation premium appears to have been eliminated.

These figures seem to apply universally as, within the EU, innovators are 2.2% more productive in 2005 rising to 4% in 2013. This suggests that the innovation premium within the EU has grown at approximately the same rate as seen in non-member states. It is important to appreciate however that R&D was not a new concept in the transitional economies overall and that there existed a Soviet style R&D system, based on research institutes, with comparatively little firm in-house activity. The accession of the NMS into the EU introduced an improved contribution of structural funds aimed at a harmonisation of R&D policies and strategies, which encouraged an enhanced role for the state (Suurna and Kattel 2010). The consequent emergence of an R&D environment based on the state, industry and universities has led to an increase in patent activity, albeit emanating from transnational sources as a result of attempts at the technological integration of the NMS (Radosevic and Auriol 1999). This suggests the beginning of a process of acquisition by MNEs intent on the integration of privatised firms into the IPNs. The process of convergence seen in 2013 with a not significant result when comparing non-innovating member firms with innovating non-members, and a significantly reduced advantage when comparing innovating non-members with members, is not altogether surprising. The transition region overall, and Russia in particular, maintained a high level of product innovation at the global technological frontier, as evidenced by the BEEPS 2013 data (EBRD 2014).

4.6 Comparison of Absolute and Relative Effects in the Manufacturing Sample of EU Membership and Selected Treatment Variables

The manufacturing sector results, seen in Table 4.2 below, are more muted than those in the full sample, having lower coefficient values with additional treatment effects in 2005, improving performance advantage, only when loans and R&D are added. In

2013 additional treatment effects are only significant in relation to exports. With the exception of foreign ownership, member firms outside the EU see benefits from the additional treatment effects in both years.

In relative terms, additional treatment effects are stronger in EU member firms in 2013 and comparatively weak outside. Overall, the manufacturing sector does not appear to gain as much benefit as the service sector.

Table 4. 2 Absolute and Relative Effects - Manufacturing Sample

ABSOLUTE EFFECTS						
Manufacturing Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
Columns	**1**	**2**	**3**	**4**	**5**	**6**
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
Loans						
ATT (in percentages) Output	0.027*** (0.010)	0.034** (0.014)	0.015* (0.008)	0.021** (0.011)	0.067*** (0.010)	0.020 (0.014)
Foreign Ownership						
ATT (in percentages) Output	0.039*** (0.005)	0.023** (0.011)	-0.007 (0.010)	-0.009 (0.020)	0.038*** (0.013)	0.091 (0.027)
Exports						
ATT (in percentages) Output	0.042*** (0.007)	0.036*** (0.012)	0.020*** (0.007)	0.038*** (0.012)	0.033** (0.013)	0.050*** (0.012)
Research and Development						
ATT (in percentages) Output	0.125*** (0.005)	0.034*** (0.011)	0.046*** (0.008)	0.025** (0.0.013)	0.179*** (0.008)	0.028 (0.020)
RELATIVE EFFECTS						
	1 vs 2		**3 vs 2**		**3 vs 1**	
Loans						
ATT (in percentages) Output	0.037*** (0.007)	0.016 (0.012)	0.047*** (0.007)	0.021* (0.012)	0.012*** (0.005)	0.024** (0.011)
Foreign Ownership						
ATT (in percentages) Output	0.058*** (0.010)	0.010 (0.017)	0.101*** (0.026)	0.047* (0.027)	0.023** (0.009)	0.037** (0.016)
Exports						
ATT (in percentages) Output	0.031*** (0.010)	0.004 (0.014)	0.043*** (0.008)	0.014 (0.012)	-0.005 (0.005)	0.047*** (0.018)
Research and Development						
ATT (in percentages) Output	0.067*** (0.013)	-0.033 (0.030)	0.124*** (0.009)	-0.021 (0.028)	0.033*** (0.007)	0.027** (0.012)

Source: Author form BEEPS 2005 and 2013

4.6.1 EU membership and Loans

The manufacturing sector displays a significantly different picture, as the differential between member and non-member firms is smaller than either the full sample or the services sector, although it remains largely constant between 2005 and 2013. In 2005, firms in member states were 2.7% more productive than non-members, rising to 6.7% when loans were included. Whilst significant, this is not as great a differential as in

the full or services samples. Interestingly, the differential increases marginally in 2013 to 3.4% (95% C.I) for EU member firms not in receipt of loans against their non-member peer group, but when loans are included, the results are not significant. A comparison between non-member firms in receipt of loans against those without, indicates the former have a 1.5% (90% C.I)) productivity advantage in 2005, rising to 2.1% (95% C.I) in 2013; although these differences are also comparatively small.

These results suggest that the labour productivity gap between manufacturing firms inside and outside the EU, including those in receipt of loans, was comparatively narrow in 2005 and remained so in 2013. This may be an indication that the manufacturing sector, both within and outside the EU, made slower progress that the service sector in the transition from a supply side demand economy with strong vertical integration, to a privatised model where the profit motive was acquired. However, the influence of loans is similar in both years in the full sample and the service sector, which indicates a consistency of influence despite heterogeneity. In 2013, the lack of significance with the addition of loans, suggests that any loan premium within the EU has weakened. This may be an indication of market failure since only 37% of firms were in receipt of loans in 2013 reducing to 33% amongst SMEs which, as far as the manufacturing sector is concerned, has negated the benign influence of institutional building over the intervening years. The positive and significant influence of loans on firms outside the EU, increasing in 2013, supports the efficaciousness of loans. The not significant result for firms in member states with loans, may be a function of the status of the company. The proliferation of Western Banks with enhanced credit checks and collateral requirements may mean that by 2013, and following the financial crisis, only the most productive firms were in receipt of loans and by then their proximity to the production frontier diminished the opportunity for any productivity improvement.

The relative results show that in 2005 EU firms without loans were 3.7% more productive than firms outside the EU with loans; a result that becomes not statistically significant in 2013. The institutional effect of membership in the manufacturing sector is lower than seen in services. This may be the influence of two factors: the significant volume of FDI into privatised industries, invested for the purpose of adding firms in the NMS to the IPNs, or the failure of these newly privatised foreign entities to provide

technological spillovers to domestic firms. In the case of the former, these firms operate with a high degree of transnational inputs which, when combined with cheap labour, reduces the value-added content. In the case of the latter, the anticipated spillover of knowhow and technology with a high level of FDI has not materialised for domestic firms in the manufacturing sector. Therefore, there is little to suggest that, in 2005 and even less in 2013, once non-EU member firms enjoy a degree of liquidity, a membership premium exists to any great extent in the manufacturing sector. In 2005, a comparison of firms with loans within and outside the EU reveals a 4.7% advantage to those in membership, diminishing to 2.1% (90% C.I)) in 2013. This confirms that membership was the more important driver in 2005, although influence had diminished in 2013, with loans providing the advantage. Inside the EU, firms with loans showed a 1.2% productivity improvement against those without; increasing to 2.4% (95% C.I) in 2013. Whilst significant, these results suggest that the loan premium may not be as significant as claimed in literature (Levine 2005). It is possible that alternative forms of finance such as leasing, where the asset provides the collateral, may alleviate a lack of loan availability (Howard-Jones et al. 2018). Overall, however, manufacturing firms show a greater level of convergence with their peer group outside the EU than is seen in both the full sample and the service sector.

4.6.2 Foreign Ownership

The manufacturing sector results indicate that, in 2005, EU firms are 3.9% more productive than their non-EU counterparts, reducing to 2.3% in 2013 (column 2 @ 99% C.I). Foreign owned firms appear to gain no advantage having an almost identical coefficient value for the combined result in 2005 and becoming not statistically significant in 2013. This is a surprising result suggesting that, in relation to labour productivity, EU membership and not FDI is the key comparator between EU and non-EU firms in the manufacturing sector. This may be a function of firms in the NMS being members of international production networks, which attracted a significant element of FDI and dominated the manufacturing sector. The nature of the investment may also have been influential as it was designed to take advantage of comparatively cheap skilled labour, resulting in a high level of foreign inputs depressing output value and the productive measurement utilised (Hunya 1997; Djankov and Hoekman 2000). A further issue may be absorptive capacity, which may impact the ability of firms to

embrace both new technology and improved production methods. There is evidence that the greater the absorptive capacity, the faster the convergence with the production frontier. The effectiveness of FDI amongst a heterogeneous cohort of firms and countries depends on the ability of both to absorb new technology and production techniques (Kneller 2005; Bijsterbosch and Kolasa 2010). An alternative view is that foreign owned firms are so close to the production frontier that further improvements in productivity may not be possible.

A comparison between non-member firms with and without FDI yields results that are not significant. This may be due to the nature of the FDI. In the NMS a significant portion of investment in the manufacturing sector was vertical in nature, whereas in the former Soviet Union it was more likely to be horizontal and possibly impeded by a lack of progress in the transition to a market economy, underdeveloped institutions and a lack of absorptive capacity. Equally, a significant element of investment in the former Soviet |Union is in extractive industries, where productivity improvements are more difficult to achieve. Carkovic and Levine (2002) in a firm level study, found no positive effects on growth even when controlling for technology. The key finding is that within the manufacturing sector, there is no evidence that foreign ownership improves productivity.

In relation to the relative results in 2005, domestic firms within the EU are 5.8% more productive than foreign owned firms outside the EU, although the result becomes not statistically significant in 2013.

This may suggest that the strength of institutional development is more important than the introduction of Western technology, production methodology and managerial skill. The lack of significance in 2013 may have two possible causes: the financial and Eurozone crises having reduced demand in Western Europe where the bulk of manufacturing output owned by foreign entities was destined, or the effect being less severe on states of the former Soviet Union, which were embracing globalisation and gaining learning experience accelerating both firm efficiency and institutional development, thus creating a convergence process.

When firms both inside and outside the EU are foreign owned, the result shows that firms within the EU are 10.1% more productive in 2005 reducing to 4.7% (90% C.I)

in 2013. This would suggest that the foreign ownership effect is circa 4.3%, an advantage which is maintained in 2013, although the institutional effect of EU membership fades as the NMS states mature within their new environment, and those outside the EU continue with an increasing liberalisation of their economies and a consequent improvement in institutional behaviour. This result indicates that when foreign owned firms are compared, the results show a greater advantage for EU member firms, revealing that outside the EU, foreign owned firms may not be as productive as those in domestic ownership. This may be a function of the distorting effect of extractive industries and possibly the horizontal nature of foreign investment in the CIS. The comparison between foreign owned companies and those in domestic ownership within the EU yielded a 2.3% (95% C.I) productivity advantage to the former in 2005, increasing to 3.7% (95% C.I) in 2013. It is also plausible to suggest that the passage of time has allowed foreign owned firms within the EU to consolidate development of the privatised entities and impose their technological and managerial superiority. This may also allow the conclusion that there is no evidence of domestic firms converging in relation to performance, possibly due to lack of spillovers (Damijan and Rojec 2004).

4.6.3 Exports

In 2005, the advantage held by the manufacturing sector of the NMS is much smaller than both the full sample and the services sector. Non-exporting EU member firms are 4.2% more productive than their non-member peer group, declining to 3.3% (95% C.I) when exports are included. In 2013, the results are 3.6% and 5% respectively. This would suggest that there is no export premium in 2005 and in 2013 appears limited to 1.4%.

Greenaway et al (2005) found no export productivity premium in a study of Swedish firms providing an indication that exporting was not always a guarantee of improved productivity. However, they claimed that the internationalisation of Swedish industry provided a possible explanation and, given the dominance of manufacturing MNEs and their utilisation of IPNs, this is an explanation that could equally apply to the NMS. A major factor in manufacturing exports is the significant inflow of FDI from the EU15, who acquired state companies during the privatisation process and created platforms for the assembly of finished and part finished product with a high imported

input content. The motivation for such investment is the low labour cost, simple logistic arrangements created by access to the single market and proximity to final destinations. The latter being a classic example of the gravity trade model (Bussière et al. 2005). The consequence of these high imported inputs is that value added has already been attributed outside the host firm, leaving the assembly plants with only labour as the main added value component. The fact that this labour is cheap, hence the initial reason for FDI, and in many instances that the process is technologically advanced, further reduces the value added element (Böröcz 2012). This has been illustrated in Mexico, post the North American Free Trade Agreement (NAFTA), where the "main characteristic of export-oriented activities is the focus on assembly-type operations with little use of domestic inputs (particularly in "mAcquisla" operations). In particular, very high import "leakages" have collapsed the export multiplier, and the assembly-type operations dominating export production have minimized forward and backward linkages with the rest of the economy" (Palma 2005 p.980). However, the fact that the coefficient value of exporters grew in 2013 against 2005, indicates that there may be some advantages to importing intermediate inputs to ensure plant survival. There is evidence from Chile that firms importing a high level of inputs are more likely to survive than exporters relying on a domestic source (Lopez 2006). This is unsurprising in the case of firms in the NMS due to their reliance on the EU to provide unit volumes, even in times of recession.

Outside the EU, in 2005 exporting firms have a 2% advantage over non-exporters which increases to 3.8% in 2013. The results suggest that non-member exporters enjoy a greater export premium than those within the EU. This may indicate that outside the EU, where institutional development is weaker and the privatisation process subject to anomalies of approach, the gap between exporters and non-exporters is greater, with the former in greater proximity to the technological frontier than the latter. There may also be a distortion due to the large part played in the economy by the extractive industries.

In 2005, manufacturing, non-exporting firms within the EU are 3.1% more productive than non-member exporters, with the results for 2013 being not significant. At the same time, EU manufacturing exporters are 4.3% more productive than their non-member peer group with the results for 2013 again being not statistically significant.

Results suggest a degree of convergence in 2013 when no member firms are the recipients of a treatment. Comparing exporters and non-exporters within the EU in 2005, the result for manufacturing is not significant but becomes significant in 2013 when it records a more productive 4.7% advantage. The rather muted result for exports supports the view that low cost, labour intensive production, allied to membership of IPNs in the more competitive environment of the EU, may have reduced the expected export productivity premium. Since the bulk of exports go intra Europe and there is evidence of a lack of a productivity premium for such a trade, the results are consistent with the findings of Bellone et al. (2010) who claimed that there were no export premia for European trade. This contributes to an explanation of the 2005 result, although the result for 2013 shows a healthy productivity advantage for exporters within the EU when compared to their non-exporting peer group. The 2013 result may be a reflection of the development of the acquired privatised firms which, having reached a state of maturity, now reflect the dominance of MNEs in relation to manufacturing exports. Cuervo-Cazurra and Dau (2009) found that structural reform and trade liberalisation had an impact on exporters with foreign owned subsidiaries being the main beneficiaries, which chimes with the rise of IPN dominated transnational supply chains.

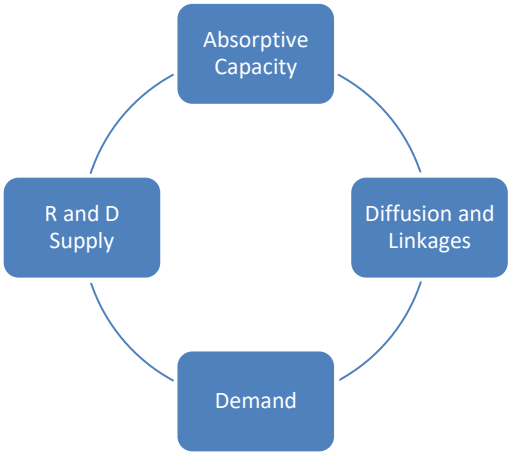
4.6.4 Research and Development

Within the manufacturing sector in 2005, the advantage of EU non-innovating firms over their non-member peer group is 12.5%, increasing to 17.9% for those investing in research and development. In tandem with other results, there is evidence of convergence in 2013 when non-innovating firms in the EU see their advantage reducing to 3.4%, whilst innovators become not significant. Amongst non-member firms in 2005, the manufacturing innovators have a 4.6% advantage over non-innovators, which reduces to 2.7% in 2013. In relative terms, non-innovators within the EU are 6.7% more productive than non-EU firms that innovate, becoming not significant in 2013. When innovators within and outside the EU are compared, the advantage of membership is 12.4% in 2005, becoming not significant in 2013. Innovators within the EU are 3.3% more productive in 2005, reducing marginally in 2013 to 2.7%.

The endogenous and new growth theories expound the virtues of the development of innovation as a pre cursor to long run economic performance. Work by Romer (1990) and Grossman and Helpman (1990) contributed to the relevance of research and development to economic growth. There is a recognised technological divide between Eastern and Western Europe and this gap extends to countries within Eastern Europe, with a recognition the there is a heterogeneity between countries with a diverse range of inputs (research and development) and outputs (patents, technology) (Krammer 2009). Investment in R&D is influenced by economic openness, protection of intellectual property, government expenditure and the presence of robust research institutions (Varsakelis 2001; Bebczuck 2002). Accession to the EU delivered these attributes to the NMS, providing them with an opportunity to innovate and the confidence that patent protection would provide security for their investment. However, there are certain requirements described by Furman et al. (2002) as the "concept of national innovative capacity" (pp 930). Essentially it established the need, not only for R&D, but also for technology diffusion, absorptive capacity and market demand. Kneller (2005) found that domestic firms, adopting foreign country frontier technology, were dependent on the absorptive capacity of the host country to achieve productivity gains.

Radosevic 2002 found a relationship between each of the components of national innovative capacity (NIC) and that the demand component contained both Keynesian and monetarist elements, suggesting that a supply and demand curve in equilibrium is an important ingredient in the promotion of innovation. He concluded that the NIC provides a platform to prove the validity of the four components, illustrated graphically below, as the key determinants of firm productivity.

Figure 4. 2 Graphical Depiction of Key Determinants of Productivity



Source: Author derived from a graphical depiction in Radosevic 2002 pp 646

In reality, five of the 11 countries within the NMS (Czech Republic, Hungary, Poland, Slovak Republic and Slovenia) have developed a robust trading sector with an emphasis on manufacturing, supported by FDI, particularly from Germany and Austria.

Only in Bulgaria and Romania are there structural problems, allied to institutional failings, where the components of the NIC concept are not being met (EBRD 2013; Becker et al. 2010). The multi valued treatment variable of EU membership and R&D is the last of the combinations, where loans, foreign ownership and exports have been linked with membership; each impacting positively on the ability to innovate and adding to the comparative advantage of EU membership, which is demonstrated in the results. Outside the EU, R&D provides a productive advantage, although with a lower coefficient value and a greater level of convergence, which suggests that the national innovation capacity is not as developed as in the NMS.

Within the total sample, only 18.8% are innovators rising to 24% within the NMS. The corporate capture of the state by multinationals, allied to a failure to improve absorptive capacity through improved education systems, has led to a failure to build national innovation capacity (Pavlínek 2016). Radosevic (2004) maintains that the failure to develop national innovation capacity is due, in part, to lack of demand from the business community. However, if the business landscape is dominated by

multinationals guarding their technology and intellectual property, there may not be the political will to effect an initiative.

The results demonstrate the importance of innovation to firm level productivity improvements and therefore the need for states to take the initiative to develop an environment in which NIC can flourish. To do so will require, certainly within the NMS, the cooperation of MNEs. Currently, as Pavlínek (2016) demonstrates, without their support, the spillover technology required, which motivates the development of absorptive capacity, will not transpire.

In 2005, the superior productivity performance of both innovating and non-innovating firms within the EU is self-evident with membership alone giving non-innovating EU companies a substantial edge. When R&D is introduced, there is an additional 4.7% increase in productive performance over non-member innovating companies. In part this superiority is due to the significant tranches of FDI entering the country and the acceleration of institutional development necessitated by the conditions for membership set by the EU. However, the structural fund support provided to the candidate states, both prior to and post accession, was also a major contributor to the development of R&D policy, combining the state with industry and institutions of higher education providing a radical overhaul of the old Soviet style system of R&D delivery. The PHARE (Poland and Hungary Assistance for the Restructuring of the Economy) programme established by the EU and enlarged to cover all the NMS, was used to channel technical and infrastructure expertise and assistance to the accession states (European Parliament 1998). This coordinated initiative, initially controlled by the European Commission, was quickly decentralised into the hands of nationally controlled agencies responsible for the implementation of innovation, infrastructure and the involvement of higher education.

Together with an influx of foreign owners, it is likely that this was, in part, how firms in the NMS achieved a superior productivity performance to their non-member peer group. It is important to appreciate that the break-up of the former Soviet Union and its satellite states also destroyed a formidable R&D system, albeit designed to support a supply side economy heavily biased toward engineering and, where there was little in-house industry, R&D initiatives. This was exacerbated by the adoption of "shock privatisation" methods, where buyers were able to pick and choose the assets required

from what was a highly vertically integrated operation, leading to gaps in the value chain and the collapse of the whole edifice (Suuma and Kattel 2010). The insignificance of the 2013 results may be due to the heavy emphasis placed on infrastructure spending within the NMS, allied to lack of spillovers from the significant FDI flow and the inefficient use of multiple agencies to deliver structural funds, all of which dissipated EU initiatives between 2005 and 2013. Equally, there is evidence that the states of the former Soviet Union have successfully modernised and improved the Soviet style R&D model, which has brought about a degree of convergence (EBRD 2014).

4.7 Comparison of Absolute and Relative Effects in the Service Sector Sample of EU Membership and Selected Treatment Variables

The services sector results in Table 4.3 below show a similar pattern to the full sample. Clearly, this sector gains more from both membership and additional treatments within the EU than the manufacturing sector. In all sectors there is evidence of convergence between 2005 and 2013, with non-member firms showing a positive response to additional treatment variables. As in the full and manufacturing sample results, the addition of treatments to non-member firms appears to nullify any advantage of membership.

Table 4. 3 Absolute and Relative Effects - Services Sample

ABSOLUTE EFFECTS						
Services Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
Columns	**1**	**2**	**3**	**4**	**5**	**6**
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
Loans						
ATT (in percentages) Output	0.109*** (0.006)	0.042*** (0.007)	0.039*** (0.006)	0.045*** (0.006)	0.151*** (0.006)	0.069*** (0.007)
Foreign Ownership						
ATT (in percentages) Output	0.122*** (0.045)	0.034*** (0.005)	0.026*** (0.009)	0.019 (0.018)	0.156*** (0.009)	0.065*** (0.014)
Exports						
ATT (in percentages) Output	0.113*** (0.005)	0.035*** (0.005)	0.083*** (0.009)	0.070*** (0.013)	0.165*** (0.012)	0.074*** (0.010)
Research and Development						
ATT (in percentages) Output	0.121*** (0.004)	0.037*** (0.005)	0.028*** (0.009)	0.053*** (0.013)	0.146*** (0.012)	0.077*** (0.012)
RELATIVE EFFECTS						
	1 vs 2		**3 vs 2**		**3 vs 1**	
Loans						
ATT (in percentages) Output	0.064*** (0.011)	-0.009 (0.009)	0.099*** (0.008)	0.015* (0.008)	0.026*** (0.005)	0.026*** (0.007)
Foreign Ownership						
ATT (in percentages) Output	0.074*** (0.011)	0.016 (0.015)	0.116*** (0.013)	0.051** (0.024)	0.025*** (0.007)	0.061*** (0.012)
Exports						
ATT (in percentages) Output	0.034*** (0.012)	-0.018 (0.012)	0.071*** (0.146)	0.009 (0.015)	0.042*** (0.006)	0.040*** (0.009)
Research and Development						
ATT (in percentages) Output	0.092*** (0.013)	-0.009 (0.013)	0.103*** (0.015)	0.024 (0.015)	0.022* (0.014)	0.040*** (0.010)

Source: Author form BEEPS 2005 and 2013

4.7.1 EU membership and Loans

Within the services sector, loans are showing an identical trend to the full sample. In 2005, firms in member states not in receipt of loans were 10.9% more productive than their non-member state counterparts, and this increased to 15.1% when loans were included. However, these results reduced to 4.2% and 6.9% respectively in 2013. For firms in non-member states, the advantage in 2005 was 3.9% rising to 4.5% in 2013. Services in 2005 represented 58% of the total sample, rising to 77% in 2013, which partially explains the trend similarities. However, it should be noted that the service

sector was largely ignored by the central planning regimes of Eastern Europe, where a Marxist view of the world emphasised the supremacy of the more productive inputs of the manufacturing sector (Eschenbach and Hoekman 2006). This lack of emphasis manifested itself in poor transport infrastructure, low grade telecommunications and a paucity of financial intermediation. Thus, those services normally regarded as essential to the workings of a market economy, were largely non-existent but, as countries transitioned, the needs of the market and its participants generated demand for a supporting infrastructure with the consequent improvement in productivity. (Bićanić and Škreb, 1991; Eschenbach and Hoekman 2006; Hartwell 2013).

The significant deviation in 2005 between the EU member firms and their non-member counterparts is likely to be the result of the accession process, in addition to improved institutional development and the creation of a service base capable of supporting a market economy. There is evidence that the EU accession countries registered an increase in service sector labour performance, which was enhanced by the boost to managerial and technological injection contributed by FDI (Eschenbach and Hoekman 2006; Fernandes 2009). Together with the effect of the Eurozone crisis on firms in the EU member states (Hartwell 2013), the convergence process between 2005 and 2013 is almost certainly due to a recognition, amongst non-member states that, in order to compete in a global market, it was essential to pursue a similar trajectory.

Between 2005 and 2013, the influence of loans within non-member states increased marginally by less than 1%. Within member states it diminished to just over 1%. In the case of those non-members, it would suggest that an efficient financial intermediation policy has failed to develop, whereas the issues for members are related to the proliferation of foreign banks with an overly prescriptive credit scoring protocol and the demand for collateral. However, the influence of loans in both member and non-member states is broadly similar indicating their efficaciousness across countries and business sectors with significant heterogeneity. This indicates the need for a financial intermediation environment to meet the needs of firms and enable them to make a meaningful economic contribution to national welfare.

The service sector appears to be the main beneficiary in terms of productivity improvement. This is unsurprising since the development of support mechanisms for a market economy, forcing an elevation from its previously subordinate role in a command economy, was bound to bring substantial productivity improvements. However, across both the manufacturing and service sectors, it is apparent that the driver of firm level performance is the institutional development that membership has brought to the NMS.

In 2005, service sector firms within the EU, without loans, were 6.4% more productive than those outside the EU with loans, although this also becomes not statistically significant in 2013. This result reveals a greater dichotomy than seen in the manufacturing sector but is not surprising. The rate of transition required by the service sector within the NMS to conform to the *Acquis Communautaire* and to support the rapid transition to a market economy, motivated a greater degree of change in firm performance than the slower rate required of firms outside the EU. This process was accelerated by the significant influx of FDI, which brought with it technology and relevant experience. However, by 2013 this effect had dissipated implying that countries outside the EU had achieved a degree of convergence in the transitional process. The lack of significance may also be indicative of a degree of resistance to the process of liberalisation within the NMS. When firms both inside and outside the EU are loan recipients, the advantage to firms within the EU is 9.9%, declining to 1.5% (90% C.I) in 2013. This would suggest that loans have added 3.5% advantage to firms within the EU, continuing to a lesser extent in 2013. This may be a function of a self-selection process with Western Banks in the NMS choosing to lend to the most productive firms. Inside the EU, firms in receipt of loans have a 2.6% advantage in both years, which supports Levine's (2005) contention that loans improve productive performance.

It is evident that in terms of both membership and receipt of loans, the greatest benefit occurred in 2005 confirming that the immediate post accession period was the most fruitful for firms within the NMS. By 2013 the effects were dissipating, with member versus non-member firms becoming not statistically significant, suggesting that there was no productive difference, regardless of loan receipt. The key issue is therefore not the efficacy of a loan receipt, for which there is ample evidence, but the deleterious

effect on non-recipients. Table 4.7 below shows the percentage of loans received by the various cohorts in 2005 and 2013, together with those firms recording difficulty accessing finance.

The most striking statistic is the low level of loan receipts across the European region and in 2005, the high incidence of obstacles to securing finance. This would indicate that it is one of the constraints to productivity improvement and there is evidence that, post accession, the proliferation of foreign banks created issues of access to credit (Caviglia et al. 2002; Thimann 2002; Volz 2010; Estrin and Uvalic 2016).

Table 4. 4 Loan Receipt and Access to Finance

Loans	**Receipt %**		**Obstacle %**	
Sample	**2005**	**2013**	**2005**	**2013**
Full	42.8	35.1	95.3	53.3
EU Membership	43.9	45.1	95.3	49.5
No Membership	42.2	31.5	95.3	54.8
Manufacturing	49.2	36.8	96.2	55.6
EU Membership	46.6	47.6	96.5	50.0
No Membership	50.7	33.2	96.2	57.6
Services	38.4	34.0	94.6	51.9
EU Membership	42.1	43.6	94.5	49.0
No Membership	36.2	30.0	94.6	53.0

Source: Author form BEEPS 2005 and 2013

No improvement in receipt of loans within the EU, allied to a decline within the non-member states, suggests that, by 2013, there had been an element of credit tightening.

Given the financial crises, this is unsurprising and broadly confirmed by the EBRD report on transition economies (EBRD 2013). Of note is the dramatic fall in the number of firms reporting difficulty accessing finance in 2013. This may be the result of capital deepening, although it is unlikely given the reduction in FDI and capital flows generally into Eastern Europe following the crises. It may however be a function of greater reliance amongst SMEs (over 80% of the sample) on informal sources of finance (Beck and Demirguc-Kunt 2006), which may in turn have resulted in firms ignoring the banking system following years of rejection.

4.7.2 EU membership and Foreign Ownership

In the services sector the results are consistent with the full sample. Domestically owned EU firms enjoy a 12.2% advantage over their non-member state equivalents, rising to 15.6% for foreign owned firms. In 2013 this advantage is reduced to 3.4% and 6.5% respectively. It is a stylised fact that services have enjoyed a significant increase in share of GDP, which is no different in the transitional economies of Eastern Europe. Evidence points to the fact that, within the new member states of the EU, the allocation of FDI has gone substantively to the services sector, particularly financial intermediation. In consequence, this sector has the highest ratio of value added, which increased substantially up to the date of accession and, excepting the financial intermediation sector, became more muted thereafter (Bijsterbosch and Kolasa 2010). It is therefore not surprising that the services sector shows a significant benefit from both EU membership and foreign ownership. Additionally, the investment in financial intermediation goes some way to explain the similarity of productivity gains between foreign ownership and receipt of loans. Outside the EU, the muted result is probably the result of the limited amount of FDI moving into a sector still in transition, albeit that in the pre-accession states of the Balkans, all banks are foreign owned. However, the convergence of performance between 2005 and 2013 suggests that, as the non-EU member states continue to develop their business models, services are becoming increasingly important as a vehicle for economic growth, supported by a degree of FDI. A further rationale for differing results is the nature of FDI in the two regions. In the NMS the emphasis is on institutional development, allied to agglomeration, whereas in the CIS, the emphasis is on natural resources and infrastructure (Kinoshita and Campos 2003).

In 2005, domestic firms within the EU are 7.4% more productive than foreign owned firms in non-member states; the result becoming not statistically significant in 2013. This may indicate that MNEs investing outside the EU, found a lack of absorptive capacity, which resulted in a diminution of any potential technological spill over. Equally, it favours the possibility that the key driver of productivity in the immediate post accession period is membership, which can be claimed as proxy for the institutional development that was a condition of EU accession and which laid the foundation for the establishment of a market supporting service sector motivated to

grow rapidly. The not significant result in 2013 is commensurate with that for the full and manufacturing sample. There is little to add to the observations given above.

Where both groups of firms are foreign owned, the advantage in favour of EU members increases to 11.6% in 2005, reducing to 5.1% (95% C.I) in 2013. The foreign owner premium appears to be 4.2%, increasing slightly in 2013. This reveals that MNEs gain more traction from EU membership and that the institutional development required to qualify for accession is an important determinant of FDI into the NMS. Membership brings with it unlimited access to an enlarged free market, whereas within the non-member states, the market is more fragmented with high tariffs in certain product areas. This could raise the question whether the difference is a trading issue rather than an institutional one however, it is the latter that has determined over a long pre accession process the right of access as a result of institutional conditionality (Hartwell 2013).

The results for foreign and domestically owned firms within the EU show that in 2005, the foreign owned were 2.5% more productive than the domestic companies; the advantage increasing to 6.1% in 2013, and these results conform to literature. Led by the information and communications technology sectors and those utilising skilled labour, the services sector attracted FDI and the introduction of MNEs into service sector development.

Allied to the liberalisation of services, this resulted in the development of successful export businesses (Fernandes 2009; Kandilov and Grennes 2010; Arnold, Javorcik, and Mattoo 2011; Fernandes and Paunov 2012). The increasing liberalisation and sophistication of markets, the greater the need for a commensurate response from the service sector, both in a supporting role and in the development and introduction of new products.

4.7.3 EU Membership and Export

The services sector result for 2005 shows a pattern similar to the full sample. Non-exporting EU firms are 11.3% more productive than their non-member peer group and this increases to 16.5% when exports are included. However, in 2013, these significant advantages reduced dramatically to 3.5% and 7.4% respectively. Outside the EU, the advantage to exporters is 8% in 2005 reducing to 7% in 2013. In 2005, non-exporting

service sector companies within the EU enjoyed a 3.4% advantage over non-member exporters, a result that became insignificant in 2013. When comparing member and non-member exporting firms, the advantage was 7.1% in 2005 again becoming not significant in 2013. When comparing exporting and non-exporting firms within the EU, the exporters enjoy a premium of 4.2% and 4% respectively.

The higher value coefficient for EU firms, particularly in 2005, resulted partially from the opportunity for the development of an export market in the NMS, together with a higher ratio of FDI (Eschenbach and Hoekman 2006). Accession to the EU exposed the NMS to a greater openness of business services to both exports and FDI, expanding employment and improving productivity. This was particularly true in sectors employing skilled labour and benefiting from the introduction of policy reforms (Fernandes 2009). In relation to exports, service firms in the NMS have become the largest exporters across a broad category, partially as a result of proximity to the EU15, but also due to improvements in institutional structures, particularly the legal environment, the advantage of time zone and the technological advances resulting from FDI (Kandilov and Grennes 2010). Non-member firms again enjoy a better export premium, which may be the result of a general lack of exposure to international trade. The differential between service firms exposed to foreign competition and the international trading environment, have possibly experienced learning by doing, whereas firms exposed only to the domestic market, are less developed than their peer group within the EU.

In the service sector, within the EU, the significance of the change required to support the market economy was associated with the utilisation of new technology, enhanced service efficiency and effective delivery platforms, which led to productivity improvements (Eschenbach and Hoekman 2006). This effect was common in both member and non-member states and the evidence of convergence, with lack of significance in 2013, suggest a degree a catch up on the part of non-members. Within the NMS, the success of the service sector exporters, having successfully challenged Asian and South American competitors, is due to membership of the common market and customs union, geographical proximity, office hours synchronisation and the quality of institutions. A further important consideration was the quality of legal institutions with the NMS, having adopted the protocols of the Acqui Communautaire,

providing a stronger base than that seen in India, South East Asia or South America (Kandilov and Grennes 2010).

4.7.4 EU membership and Research and Development

In relation to the disaggregated samples of manufacturing and services, there are similarities of results with the full sample. As the commentary within the manufacturing section resonates with that of the service sector it justifies limiting any further discussion to that which relates specifically to services. Within services in 2005, the advantage EU non-innovating firms have over their non-member peer group is 12.1%, increasing to 17.9% for those investing in research and development. In tandem with other results, by 2013 there is evidence of convergence when non-innovating firms in the EU see a reduction to 3.4% and 7.7% amongst innovators. Amongst non-member firms in 2005 the advantage is 2.8%, rising to 5.3% in 2013.

The relative results in 2005 show that non-innovating EU firms had a 9.2% advantage over the innovative non-members, increasing to 10.3% amongst the EU innovators. This would suggest that the R&D premium is only just above 1%. The results become not significant in 2013. Within the EU, firms with R&D programmes were 2.2% (90% C.I) more productive in 2005, increasing to 4% in 2013. This indicates that both within the EU and outside, an innovation premium exists with firms consolidating their productive advantage in 2013 indicating that, in comparison to the manufacturing sector, both EU and non-EU service sector innovators had improved their research and development capability.

Horizontal investment formed a significant proportion of the considerable FDI going into the service sector, where presence on the ground was required to take advantage of the local market. Examples of this were in energy and telecommunications where, given the lack of emphasis on services within a command economy, it was vital to bring technology and knowhow to create efficient and competitive businesses ((Eschenbach and Hoekman 2006). Within the NMS, the propensity to innovate was higher amongst foreign owned firms than those in domestic ownership and, unlike manufacturing MNEs seeking vertical investment, those in the service sector were forced to share skills and technology with their host country labour force (Falk 2008). Thus, it was more likely that spillovers would occur in this environment than in

manufacturing, where there was both an opportunity and a desire to protect intellectual property.

Market liberalisation introduced a need for a supportive service industry and necessitated significant development of the sector. This involved the introduction of foreign entrants and de novo firms, which lead to innovation and the creation of cheaper prices, higher quality and a greater variety (Arnold, Javorcik, and Mattoo 2011; Fernandes and Paunov 2012). Evidence suggests that the development of the service sector contributed to manufacturing productivity with domestically owned firms receiving the greatest benefit (Damijan et al. 2015). The results seen in this thesis shows some evidence for this in 2005, but none in 2013.

4.8 Conclusion

This chapter measures the productivity of firms within the NMS against a control group of firms in the rest of Eastern Europe that are not members of the EU, including the former Soviet Union. A multi valued approach was adopted to enable the measurement of EU membership, allied to some of the key determinants of firm level productivity.

The results indicated that EU membership provides a positive advantage to member firms, with coefficient values higher in 2005 than 2013, by which time a significant level of convergence was observed. In 2013, a number of the results were not statistically significant and these, together with the evidence of convergence, suggested that the effect of the global and Eurozone crises affected EU member firms by reducing fund flows and collapsing demand in the EU15 (Medve-Bálint 2014). This may have played some part in the convergence process but, when the absolute and relative results were compared, it was apparent that in 2005 the primary influence was EU membership; the additional treatment effect of loans, foreign ownership, exporting and research and development having a lesser effect. This latter effect, R&D, seems to have been broadly universal across both member and non-member firms.

Clearly, the immediate post accession period was the most important from the point of view of the institutional development contribution. Additional motivation was provided by the imperative to conform to the Acqui Communautaire, which was

pivotal in ensuring that the rule of law, effective regulations, efficient infrastructure and a developing and supporting service sector were in place. Further encouragement came from the opportunity for foreign direct investment and access to the enlarged EU market. In turn this encouraged competition, driving up productivity. Hartwell (2013) found that a liberalised market encouraged the growth of institutions and ensured their robustness. Using a different dataset, model and specification, the results in this thesis confirm those findings.

By 2013 institutional influence was dissipating and the relative effects of EU membership, with no additional treatment variable, was becoming not significant when measured against a non-member firm with an addition. This suggested that the added advantage of a multi valued treatment effect in non-member firms was sufficient for convergence with firms in the EU not benefitting from an additional treatment. Hence, the conclusion is reached that EU firms, having suffered from the Eurozone crisis, had reached a plateau of maturity where institutional development was concerned.

The manufacturing sector within the EU benefitted from the acquisition of numerous privatised entities as vertical or horizontal investment vehicles.

The former was aimed at exploiting the comparative advantage of cheap skilled labour, and the latter to provide products in local liberalised markets where the introduction of technology introduced a competitive product, often of superior quality. This encouraged domestic firms either to improve their own productivity and quality or exit the market. Additionally, the PHARE initiative brought significant support for the manufacturing sector with the introduction of improved infrastructure and process innovation.

The lack of a significant result for manufacturing in 2013 was almost certainly due to the global financial and Eurozone crises, allied to the improvement in the productivity of non-member firms. The automotive sectors in both the Czech and Slovak Republics experienced a significant decline in demand for finished goods and components due to reduced global demand. Workers were laid off and, whilst the most productive firms survived the crisis due primarily to foreign ownership, some local labour-intensive suppliers upstream of the process, were forced to exit the market (Pavlínek 2015). It

is not unreasonable to conclude that this applied to the manufacturing sector throughout the region and would have led to a slowing down of research and development. Although the NMS had attracted significant FDI, which had contributed to stimulating innovation, particularly during the period leading up to accession, the flow of funds subsequently diminished, partially as a result of difficulties within Western banks but also due to a general slowing down of FDI (Bevan and Estrin 2004; Dijkstra et al 2015).

With the exception of research and development, the service sector had higher value coefficients than manufacturing, reflecting the significant changes required in the transition from a command to a market economy. This resulted from the liberalisation of the sector, allied to significant flows of FDI, since the single market introduced not only a trade in goods, but an improved environment for the trade in services (Eschenbach and Hoekman 2006). Both factors increased productivity in the sector, but also the performance of the downstream manufacturing sector where services influenced its activities. Evidence from the Balkans indicated that services attracted more FDI than manufacturing and had a greater impact on productivity.

Similar evidence from the Czech Republic revealed that the liberalisation of the service sector had a positive and significant effect on downstream manufacturing (Arnold et al. 2011, Howard-Jones et al. 2018). In Eastern Europe, the service sector became increasingly important and came to represent more than half of economic activity (World Bank 2006 and 2013). The conditionality attached to the accession process predicated an imperative for the establishment of an effective service sector, which provided a greater incentive than the less organised and more haphazard transitional process observed in the non-member states. Although this was advantageous for firm productivity in the NMS, by 2013 there were signs of convergence with the non-member states, albeit that some were showing signs of still being stuck in transition (EBRD 2013).

There is evidence that the additional treatment variables of loans, foreign ownership, exports and research and development had an appeal both in the NMS and the non-member states, where firms in receipt generally showed an improved performance. These findings conform to literature, which revealed that firms in receipt of loans

improved productivity, confirming Levine's (2005) findings of the importance to firm performance of access to finance.

Foreign owned firms were more likely to be larger, if not older, the most productive and more likely to have committed a significant element of capital, management and technology (Fryges and Wagner 2007, Wagner 2012). Exporters were more productive than non-exporters, although there may have been a self-selection process as those exporting were more likely to have been the more productive, evidenced by both the absolute and relative results (Wagner 2007, 2012). However, when comparing the relative performance of MNS firms against their non-member peer group, there was a lack of significance in the results for 2013. This could have been due to the Eurozone crisis dampening demand in the wider EU or, as the majority of NMS exports were IPN related and, given the high volume of transnational inputs, the scope for added value was limited, thereby reducing the opportunity for an export multiplier. The PHARE initiative and the EU structural funds support positively benefited those firms prepared to undertake research and development initiatives and in 2005, the presence of a more advanced institutional development programme gave firms in the NMS an advantage.

Whilst this was dissipating by 2013, as the old Soviet style R&D model was replaced by one more conducive to a market economy, recessionary pressure impeded R&D investment within the NMS.

Firms within the EU were more productive and EU membership provided the most impact. Added impetus came from the additional treatment variables in 2005, but dissipated in 2013, particularly in the manufacturing sector. When the additional treatment variables were added to non-member firms in 2013 and the results compared with member firms with no added treatment, results became not significant. This confirmed the observation that the EU institutional effect was diminishing. Loan recipients enjoyed a positive advantage both within and outside the EU. Foreign ownership proved impactful in relation to productivity although in 2013 it was more evident in the service sector. Research and development had its strongest showing in services, which may reflect the externality of the process in the transition economy, and that its delivery was regarded as a service sector function.

The trend observed across both absolute and relative results emphasises the importance of EU membership, which is essentially a proxy for institutional development.

The establishment of a strong institutional base attracted FDI, with foreign owners improving the productive capacity of the NMS. Allied to access to a wider free market and the availability of structural funds, a platform for continuous improvement was provided. This would suggest that the basic tenets of the Washington Consensus programme are efficacious in promoting firm level productivity. However, the absence of statistical significance in some areas, together with evidence of convergence in others, may indicate a dissipation of the effect after an initial period of productive advantage.

Chapter 5 – The Determinants of EU Membership on the Performance of Firms across the Productivity and Profitability Distribution Curve Using a Quantile Treatment Estimator

5.1 Introduction

The previous chapter explored the influence of EU membership in which the performance of treated firms (members of the EU) was compared to those not treated (non-member firms). This basic comparative measure is enhanced by a multi valued approach, adding a further treatment variable to enable the measurement of any increased or decreased effect. The model is specified to determine both absolute and relative effects. This further enables the observation of the treated or untreated condition of each group of firms and allows a comprehensive analysis of every combination. However, what is measured is the potential outcome mean of each estimator, providing a comparison between each set of results conditional on a number of covariates. This chapter introduces a Quantile Treatment Estimator (QTE) which, in the case of this research, examines the relationship between a vector of independent variables and the conditional quantiles of the dependent variables, productivity and profitability, contingent on the treatment variable, EU membership. Thus, it provides a more comprehensive picture of the effect of the independent variables on the dependent variable, which is continuous, having neither zeros nor too many repeated values. The sample of firms is heterogeneous with different characteristics, which determines both their efficiency and profitability and, because the model deals with the conditional median, it provides a more favourable treatment of outliers. The main thrust of the study is productivity, although profitability has been introduced, partially as a robustness check and to ascertain whether there are any firm behavioural differences at different points of the distributions. Disaggregating the result into the manufacturing and service sectors will provide further evidence of firm performance in the context of the markets serviced.

This chapter uses a quantile treatment estimator to measure the effect of membership and other key variables on the performance of treated firms (those in membership) and the subsequent effects across both productivity and profitability distribution curves.

The outcome variable is productivity (output per worker) and profitability (sales per worker) and the treatment variable of interest is EU membership. The control variables are interpreted to identify what influences firm performance at successive levels of productivity and profitability, and the significance of each of these characteristics extant in each quantile. For ease of observation, the full results have been included in each table and the text reports the significance of the results for each quantile. EU membership is regarded as exogenous, which restricts the estimation strategy to the application of the estimator proposed by Koenker and Bassett (1978). At firm level, EU membership can be treated as exogenous to the decisions and actions of the firm; EU membership being conferred on the state.

The objective is to evaluate, at each percentile of the distribution curve, whether EU member firms benefit from their membership and whether the effect on productivity and profitability varies across the distribution curves, particularly in relation to the key themes of EU membership, firm characteristics (age and size), ownership, export orientation and loans. There is evidence that there is a significant heterogeneity in the performance of firms, even in similar industrial sectors, and the degree of change experienced is significant. Therefore, the question of why firms display such disparate performance characteristics and what influences these traits is an important topic for discussion (Bartelsman and Doms 2000). When a major political and economic shock is experienced, such as accession to the EU, identification of which firms benefit from the experience and why, can contribute to the debate and inform policy.

There is an assumption that EU membership is a desirable outcome, since access to the single market, a customs union and a stable institutional environment provides all the ingredients necessary to achieve economic growth. In the previous chapter, the benefits of EU membership, allied to other selected key variables, was established in both absolute and relative terms. However, what was measured was the potential outcome mean, which does not capture the heterogeneous nature of firm performance and therefore provides only part of the story. It fails to identify the continuous behaviour of the dependent variable, subjected to a vector of conditional variables, across its quantile distribution. The influence of a conditional variable, at each quantile of the dependent variable will be different, given the dynamic nature of both productivity and profitability results, even amongst competitors in the same business

sector. The influence of a specific conditional variable on a firm in the 10th percentile, representing the least productive firms, may well be different from a firm in the 90th percentile representing the most productive, and the use of a treatment model (EU membership) means that the dangers of widespread heterogeneity have, to some extent, been reduced. This paper follows broadly the approach taken by Girma and Gorg (2005) and uses conditional quantile regressions to examine the impact, across the distribution curve, of what influences performance in relation to the application of the key tenets of the Washington Consensus programme when applied to firms. This permits an analysis of whether firm characteristics affect the results and whether the results conform to findings in literature.

The results cover the outcome variables productivity and profitability for 2005 and 2013: 2005 being one year after the accession of eight of the eleven NMS; Bulgaria and Romania following in 2007 and Croatia in 2013. It should be appreciated that the act of accession was the culmination of a lengthy probation period when states gradually conformed to the Acqui Communautaire. Nevertheless, it is reasonable to describe post accession as developmental, whereas, by 2013, a state of maturity had been achieved. Four major themes are explored in this chapter: EU membership, ownership, particularly relating to FDI, exporting and receipt of loans. The control variables of firm age, size, GDP growth and inflation are briefly evaluated. EU membership is seen to be advantageous across the distribution curves with the least productive and profitable firms gaining the most benefit. Foreign ownership is also positive and significant, although in this instance the greatest gains are seen at the top end of the curves. Exporters fare less well. Only the service sector demonstrates any appreciable improvement in 2005. Firms in receipt of loans show a consistent improvement, however the real story is revealed by the descriptive statistics, which show that less than 50% of firms are in receipt of loans suggesting possible market failure. Older firms show little evidence of improvement, whilst larger firms beyond the median show improvements in profitability in 2013.

A total of 12 regressions cover the outcome variables productivity and profitability for 2005 and 2013, including the full sample and separately, manufacturing and services. These are included in appendices 5a to 5f and 6a to 6f. Descriptive statistics are included at Appendix 7.

For ease of observation, comparison and interpretation summary tables and, where relevant, graphical or schematic figures are included in the body of the text, which follows a thematic approach.

5.2 Quantile Regression Methodology

Like the OLS model, the IPWRA model is concerned with mean effects; this being the case with the majority of econometric modelling. The IPWRA model observes only the relationship between the mean of the dependent and independent variables. However, the distribution of the dependent variable can change and is only partially revealed when using only the mean, indicating that an alternative model is required to explore the distributional effects. In this research, the heterogeneity of both countries and firms will mean that different levels of productivity and profitability will occur across the distribution and therefore relying on the mean will provide only a partial picture of firm level performance and the effect of the conditional variables. The quantile treatment effects (QTE) model allows measurement of the effects of explanatory variables across each percentile of the entire distribution, with the added advantage that the use of median as opposed to mean, reduces the susceptibility to outliers. This resolves a number of issues by providing flexibility, analysing data with heterogeneous conditional distributions and showing the different effects of the conditional variables on the dependent variable across its complete spectrum.

The use of quantile regressions continues to evolve, the model selection being dependent on whether the QTE is conditional or unconditional and the treatment variables exogenous or endogenous. The conditional model is estimated, thus controlling for firm and market characteristics and, due to the lack of valid instruments in the datasets, it is not possible to estimate conditional endogenous models. Thus, EU membership is regarded as exogenous. This restricts the estimation strategy to the application of the estimator proposed by Koenker and Bassett (1978). The application of the model initially requires a preliminary nonparametric estimator, in the form of propensity score logistic regressions, to determine the treated and untreated sample (0, 1).

The effect of a binary treatment variable D, in this case EU membership, is observed on a continuous outcome variable Y, namely productivity (output per worker) or

profitability (profit per worker). We assume that $Y_i^1 and\ Y_i^0$ are the potential outcomes where Y_i^1 would be the result if firm *i* was in a country which was a member of the EU (*i.e.* denoted as treatment 1) and Y_i^0 would be the outcome if firm *i* was not a member (*i.e.* denoted as treatment 0). This allows us to determine, at all percentiles of the distribution curve, the effect of the treatment on the outcome. However, the model utilised is a conditional model, which utilises covariates (x) and characteristics of these observations will be used to inform and expand the debate. It is assumed that Y (productivity or profitability) is a linear function of X (conditional variables) and D (treatment variable).

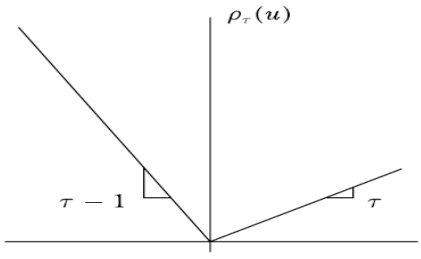
The OLS model minimises the sum of the squares of the model prediction error e_i, $\sum_i e_i^2$. The median regression, also known as the least absolute deviation (LAD) minimises $\sum_i \| e_i \|$. The quantile regression minimises $\sum_i$ q $|e_i|$ +$\sum_i$ (1- q) $|e_i|$, a sum that provides asymmetric penalties q $|e_i|$ for under prediction and (1- q) $|e_i|$ for over prediction, both against the median. The distribution of the dependent variable into quantiles can be characterised by denoting each quantile as the τ^{th} quantile of Q^τ (Y) of the dependent variable Y_i^d where i is the individual observation and *d* is the treatment.

It can then be explained thus:

$$Q^\tau(y) = \underset{c}{argmin} \sum_{i=1}^{n} \mathbb{E}[\rho_\tau (y - c)] \qquad (7)$$

where $\rho_\tau(\mu) = \mu * \{\tau - 1(\mu < 0)\}$ is a quantile loss function which is the mechanism which assigns weights to the positive and negative deviations from the median and allows the discovery of the potential outcomes at each selected point in the distribution. This can be described as the tilted absolute value function and is illustrated in figure 5.1 below.

Figure 5. 1 Graphical Depiction of Tilted Absolute Value Function



Source: Koenker and Hallock 2001

Q_{ε}^{τ} refers to the τth quantile of the unobserved random error term ε_i. It is assumed that

Qτ (εi || β, xi) = 0

and is introduced to ensure that the random errors are centred on the τth quantile (Marino and Farcomeni 2015).

The model for potential outcomes therefore is:

$$Y_i^d = X_i \beta^{\tau} + d\delta^{\tau} + \varepsilon_i \qquad (8)$$

Y is the continuous dependent variable with Y_{1i} ……Y_{in} representing the sample of observations and $d \in (0, 1)$ the treatment effect, allowing Y_i^d to characterise the distribution of the dependent variable in terms of quantiles including the treatment effect. $\beta^{\tau} and\ \delta^{\tau}$ are the unknown parameters of the model. β^{τ} is a vector of unidentified fixed parameters which summarises the effects of x_i on the specific conditional response of the outcome variable in quantile τ. δ^{τ} represents the conditional QTE's at quantile τ. The linearity assumption above is insufficient to identify the QTE's because the observation D_i may be correlated with ε_i with the danger of endogeneity. The assumption is that D and X are exogenous. The selection on observables with *X* can be taken to be:

$$\varepsilon \perp (D, X) \qquad (9)$$

Taking Equations (6) and (7) together implies that $Q_{Y|X,D}^{\tau} = X\beta^{\tau} + D\delta^{\tau}$ where $Q_{Y|X,D}^{\tau}$ represents the τ quantile of y conditional on the treatment variable D and the conditional variable X at that particular junction. This allows the recovery of the unknown parameters of the potential outcomes from the joint distributions of the observed variables Y, X and D.

The estimator by Koenker and Basset (1978) can now be utilised to estimate the unknown coefficients:

$$\left(\hat{\beta}^{\tau}, \hat{\delta}^{\tau}\right) = \arg\min \beta, \delta \sum \rho_{\tau}(\mu)\,(Y_i - X_i\beta - D_i\delta) \qquad (10)$$

Alternatively, the equation can also be annotated to show clearly the positive and negative deviations from the median

$$\hat{\beta}^{\tau}, \hat{\delta}^{\tau} = argmin_{\hat{\beta}^{\tau}, \hat{\delta}^{\tau}} \sum_{i:y_i \geq x_i' \beta^{\tau}} \tau |y_i - x_i' \beta^{\tau}| + \sum_{i:y_i < x_i' \beta^{\tau}} (1-\tau) |y_i - x_i' \beta^{\tau}| \quad (11)$$

This equation is solved by the use of linear programming methods, which provide a means of achieving an optimal solution. Linear programming (LP, also called linear optimization) is a method to achieve the best outcome (such as maximum profit or lowest cost) in a mathematical model whose requirements are represented by linear relationships. Linear programming is a special case of mathematical programming (also known as mathematical optimization). This thesis uses the IVQTE command in Stata, which claims an advantage over the older qreg model, as it generates analytical standard errors that are consistent in the presence of heteroscedasticity (Frölich and Melly 2010).

5.3 Results and Analysis

This section seeks primarily to determine the effect of EU membership on firms within the NMS at different percentiles of the productivity and profitability distribution curve and to observe any trends which might identify at which percentile any accrued benefits are strongest. At the same time, the effect of each conditional variable is measured to ascertain its effect across the distribution curve. This will allow the identification of firm characteristics that obtain optimal benefits from, more broadly, membership and more specifically each of the conditional variables utilised and to measure the results against the hypotheses promulgated.

The model utilised uses log of output per worker and log of profit per worker as the dependent variables, with EU membership as the treatment variable. A vector of conditional variables provides the opportunity to establish their influence at each percentile of the distribution curve and are predicated by reference to literature. They are age and size of firm, foreign ownership (proxy for FDI), domestic ownership, exports and loan recipient. Two control variables are used, namely GDP growth and inflation, and a sector dummy variable (manufacturing =1, services =0).

The use of institutional variables has been eschewed due to a significant degree of correlation with EU membership, which in itself contains all the attributes related to

government and the rule of law. Furthermore, the model relies on EU membership and the control variables being exogenous. The omission of institutional variables reduces the risk of endogeneity.

The profitability results are measured as gross margin. The reporting of labour, material and energy costs, in the context of a survey questionnaire, should be viewed with a degree of caution and should be regarded as a limitation of the research. There is some evidence of under reporting of costs which may distort the results somewhat. However, in order to obtain both a robustness check and some measure of the effect on profitability the exercise was deemed appropriate and the results do provide a comparative effect between the performance measurements. As a precaution, in relation to the veracity of the profitability results, the models were run on the basis of reducing the gross profit to a maximum of 50% gross margin. This figure was derived from the researcher's extensive experience of international business including in Eastern Europe and the former Soviet Union. The results were found to be broadly similar and therefore left on file.

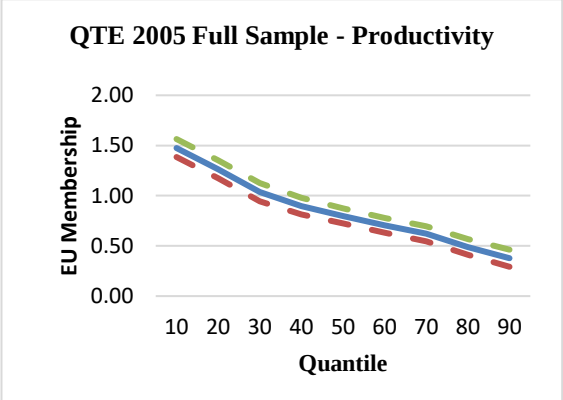
The chapter focusses on four major themes, namely EU membership, firm ownership, exporting and loans and analyses the impact of each on productivity and profitability within the EU in 2005, one year after the accession of eight of the eleven NMS, and 2013, a minimum of six years post accession of 10 of the eleven countries. These periods can be viewed as, initially a development phase and, subsequently a period of maturity. Each themed discussion is contained in one section to ensure continuity of narrative with the profitability section being used both as a robustness check and to identify any point of difference between productivity and profitability. In the previous chapter, the absolute and relative influences of these themes were examined, centring on the potential outcome mean to allow broad conclusions to be discussed within a heterogeneous environment. This chapter provides a whole new dimension, allowing the impact of key variables to be measured across the distribution curves to determine where the greatest impact is being experienced. As in chapter four the coefficient values are assumed to be at 99% confidence interval unless otherwise stated or identified as not significant.

5.4 The Effect of EU Membership on Productivity

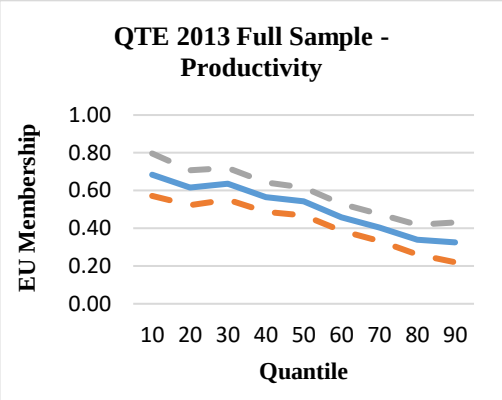
Reference to Figures 5.1a to 5.1f below indicates that EU membership is positive and significant across all productivity distribution curves, demonstrating that firms within member states gain a productivity advantage as members of the European Union in both 2005 and 2013. However, it should be noted that, in all instances, the greatest benefit occurs at the lower end of the curves with the coefficient value tailing away. The dotted lines represent the upper and lower bounds of the 95% confidence interval.

Figure 5. 2 1a to 1f, the Effect of EU member on Productivity across the Distribution Curve

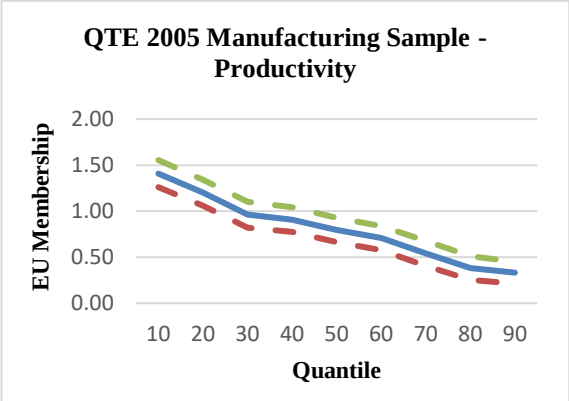
1a.



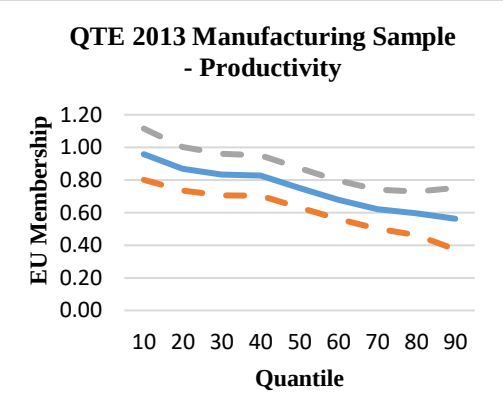
1d.



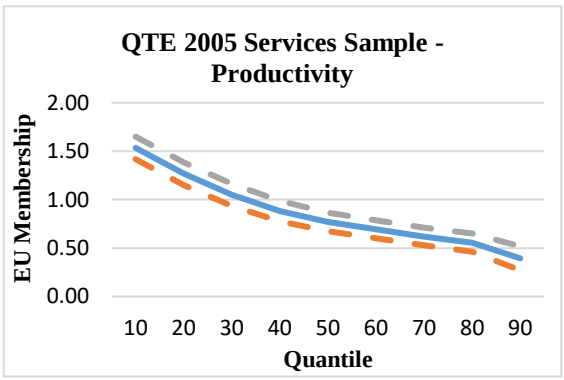
1b.

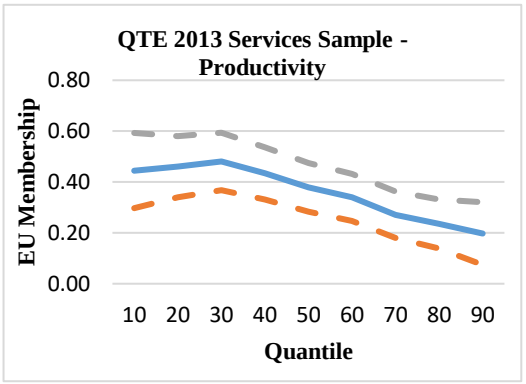


1e.



1.c **1.f**





Source: Author

This supports the hypothesis that firms within the EU gain a productivity boost from membership, supporting the conclusion arrived at in chapter 4, with each result providing a robustness check with the use of different models. Reference to Table 5.1 below shows a summary of the results across both the sectors and years.

Table 5. 1 Summary of the Results for Productivity with EU membership as the Independent Variable

		Full sample			Manufacturing sector			Service sector		
Independent variable	Date	q.1	q.5	q.9	q.1	q.5	q.9	q.1	q.5	q.9
EU Membership	2005	1.484*** (0.046)	0.788*** (0.038)	0.377*** (0.044)	1.408*** (0.077)	0.798*** (0.067)	0.332*** (0.061)	1.530*** (0.059)	0.774*** (0.049)	0.389*** (0.064)
EU membership	2013	0.692*** (0.057)	0.544*** (0.037)	0.332*** (0.332)	0.956*** (0.080)	0.764*** (0.062)	0.592*** (0.100)	0.447*** (0.075)	0.389*** (0.049)	0.207*** (0.063)

Source: Author

5.4.1 The Full Sample

In 2005, in relation to the full sample, the results at each percentile are positively significant with a coefficient value of 1.5 at the 10th percentile reducing to 0.4 at the 90th. The results imply that the least productive firms gain the greatest benefit on a ratio in excess of 3 to 1. The intensity of competition into a hitherto protected economic environment will have forced firms lagging in productive performance either to improve or exit the market. The results may indicate a post exit effect, where the surviving laggards are demonstrating the extent to which they have had to improve

to remain in an increasingly competitive environment, introduced by foreign firms seeking horizontal investments and higher quality imports arriving from the EU15. It is equally salient to observe that the most productive firms also show the benefits of membership, but at a lower level, which might be a function of proximity to the production frontier, or of foreign direct investment, improved management and technological transfer, at least to the host firm (Gabrisch and Hölscher 2006).

In 2013, EU membership is positive and significant across all percentiles but with lower coefficient values (0.692 at the 10^{th} percentile and 0.332 at the 90^{th}) across the distribution curve, indicating that the immediate post accession period brought the greatest benefit.

Equally, reference to figure 1b above shows that the decline in membership shown across the distribution curve is shallower in 2013 indicating that, whilst the least productive firms gain the most benefit, the difference between the top and bottom of the curve is less pronounced. Interestingly, at the higher end of the curve, the most productive firms continue to enjoy the same level of benefit as in 2005, with the least productive seeing their benefits broadly halved. This suggests that, over the intervening years, the least productive firms continue to achieve a modicum of improved productivity as they have become more accustomed to the more competitive environment of the EU, whilst the more productive firms continue to capitalise on their greater efficiency and the benefits of membership without any diminution. Overall, the advantages of EU membership have endured over the intervening 8 years, despite both the global financial and Eurozone crises, which may indicate the NMS were less affected than the rest of the EU.

A further aspect absent from micro economic firm level studies of EU accession is the impact of EU Structural and Cohesion Funds, which work together to provide economic, social and territorial growth and cohesion. There is evidence that an element of these funds was invested to improve the productivity of the new member states (NMS) by allowing firms to improve competitiveness and achieve the standards required (Kutan and Yigit 2007; Rau and van Tongeren 2009). It is therefore plausible that the impact of these funds may also have contributed to the improvements achieved.

The results for 2013 should be viewed in the light of the global financial and Eurozone crises of 2008 and 2009 respectively. At the onset of the crisis, the NMS were in an economic environment which seemed capable of withstanding its effects. However, falling exports, reduction in FDI and the repatriation of capital by foreign banks led to recession and increasing current account deficits (Orlowski, 2010). The heterogeneity of the institutional environments, allied to a degree of state capture, created developmental models in which economic shocks threatened to destabilise the economy to a degree which threatened long term development (Drahokoupil and Myant 2010). The Czech Republic, the Slovak Republic and Hungary all experienced significant reduction in exports with the latter, and Latvia, seeking emergency support from the IMF; even Poland suffered a 30% currency devaluation.

This resulted in a significant increase in the unemployment rate, with a consequent reduction in aggregate demand (Blažek and Netrdová 2011). Nevertheless, firms continued to benefit from the productivity premium offered by EU membership, although it should be stressed that the nature of the data means that only surviving firms are captured and the degree of attrition at firm level cannot be measured.

5.4.2 The Manufacturing Sample

The results for the manufacturing sector have similar profiles to the full sample. EU membership is positive and significant at all percentiles, confirming the advantages gained, with the gains being more significant at the lower end of the distribution curve but with the coefficient values at a lower number. Interestingly, in 2013, up to the 60th percentile, the coefficient values are lower than in 2005, suggesting a reduction in the effect of EU membership. Beyond that however, values are higher, indicating that the most productive firms have succeeded in increasing traction, albeit from a lower base.

Manufacturing in the NMS has been transformed by four major effects, privatisation, FDI, competition and the possibility of spillovers from foreign managerial and technological expertise. The results indicate a lower gain for the manufacturing sector, and this is evidenced by the negative outcome for the sector dummy (manufacturing = 1, services = 0). The sector dummy indicates that the service sector is more productive than manufacturing, with a growing divergence of productive efficiency towards the top end of the curve: a trend that is apparent in both 2005 and 2013. This may be the

result of rapid productivity growth in the service sector in the immediate pre-accession period, allied to the development of highly productive information and technology clusters, together with the liberalisation of finance (Fernandes 2007).

There is a further dimension relating to the manufacturing sector, and that is the importance of foreign owned IPN's that are an important part of the NMS economies. There are various issues to be assessed when considering this effect. The primary motivation for FDI in this area is the use of the comparative advantage of cheap labour allied to the proximity of the host nation to the MNE base (gravity model). In terms of the measurement of firm performance, it is a reasonable assumption that these companies will be at the higher end of the productivity distribution curve and that they will be major exporters. Equally, they will have a significant percentage of foreign inputs relying on cheap labour to complete the final assembly. Therefore, the more subdued nature of the benefit from membership in 2005 may be the result of labour being a major part of the assembly operation, transfer pricing protocols and currency valuation distorting output value, and the superior efficiency of foreign owned firms placing them closer to the production frontier. Therefore, the hypothesis that EU membership improves productivity holds true for the manufacturing sector, with the important caveats detailed above. The explanation for the 2005 results also points to the fact that the declining coefficient value was the result of firms closest to the production frontier having less to gain than those furthest away. However, the fact that this cohort now outperform the gains made lower down the curve suggest that a different dynamic may be at work in 2013. Over the intervening years, these firms may be increasing their capital intensity, thus reducing their dependence on labour, leading to an increase in productivity. There is some evidence for this between 2000 and 2007 when foreign capital stock increased from $107 billion to $624 billion and, despite the financial crises, to $730 billion by 2014, equivalent to 3% of global investment stock (Medve-Bálint and Bohle 2016). Given the results for foreign ownership it is not unreasonable to opine that MNEs are amongst the most productive and have continued to drive efficiency in their acquired plants.

As a general rule, the efficaciousness of EU membership is therefore maintained in 2013, however, there will be winners and losers in this process as the NMS are forced to move away from the concept of state support to a rules-based regime imposed as a

condition of EU membership. In this environment, the implementation of rules created in sophisticated Western economies can impose prohibitive costs on weaker domestic firms and have the capacity to destroy whole industrial sectors (Bruszt and Langbein 2017).

5.4.3 The Service Sector Sample

The reform and development of the services sector in the NMS has been a feature of the transition process. During the Soviet era, the command economies of Eastern Europe paid scant regard to services, believing that production was the well spring of the economy.

However, the transitional period has seen wide scale institutional reform leading to the development of the service sector and increasing convergence with the EU15s and now represents 68% share of GDP (Eschenbach and Hoekman 2005). The development of the NMS services sector, together with the advantages of proximity of the EU15 and allied to technology improvements, has made the NMS a serious competitor to both India and Brazil, particularly within the EU (Kandilov and Grenne 2010).

The effect of EU membership on the services sector is similar to observations for both the full sample and the manufacturing sector, where the coefficients are positively significant across all percentiles and show a declining trend towards the top of the curve. However, the value of service sector coefficients at the beginning (10th to the 30th percentile) and the end (70th to the 90th percentile) are greater than the manufacturing sector, indicating that firms are achieving an enhanced benefit at both the lower and higher ends of the curve. By contrast, results surrounding the median indicate that there is a marginal advantage to the manufacturing sector.

The negative significance of the sector dummy in the section covering the full sample indicates that the service sector outperforms the manufacturing sector in terms of productivity, therefore, the superior gains made are not altogether surprising. It is important to appreciate that services were neglected in the command economies of Eastern Europe and it was a significant journey from an environment where infrastructure, telecommunications and financial intermediation were inadequate, to a situation in which the sector is sufficiently developed to support a market economy

and take advantage of export opportunities into the EU15. FDI has played a major role achieving this, with foreign investors anxious to take advantage of the horizontal benefits of infrastructure improvements. Others, with the knowhow and technology to develop financial intermediation, marketing, sales and service support for a manufacturing sector, geared up to supply a burgeoning consumer market. De novo firms, bringing with them higher quality, more variety and customer focus working in a competitive market which reduced pricing, blossomed in an environment in which such services were being developed from the ground upwards (Arnold et al 2011; Fernandes and Paunov 2012).

These new initiatives resulted in several improvements to infrastructure and telecommunications although, where domestic providers met foreign competition, they either significantly increased their productivity or exited the market (Eschenbach and Hoekman 2006). Empirical studies also reported positive impacts on the productivity of manufacturing firms and FDI provided benefits to domestic firms (Nicoletti and Scarpetta 2003; Fernandes 2009; Forlani 2010; Damijan et al. 2015). Additionally, with the aid of foreign techniques and new technology a burgeoning export sector was created which allowed it to compete with India, China and Brazil for outsourced work from the EU (Kandilov and Grenne 2010). Therefore, the hypothesis that EU membership has provided the opportunity for the service sector to improve productivity can be accepted, recognising that this has been aided by significant inflows of FDI.

However, unlike in the manufacturing sector, the coefficient values are significantly lower in 2013 than in 2005, indicating the diminishing effect of membership as the service sector shows a greater degree of maturity and increasing convergence with the EU15 (Fernandes 2009). In 2005 the service sector had higher coefficient values, across the distribution curve, than the manufacturing sector, which was probably a reflection of the degree of increased efficiency required from a low base in order to support a market economy. In 2013 the trend had reversed, with manufacturing gaining the most from membership. There is evidence that the reform and development of the service sector has improved the productivity of manufacturing. There is a degree of inevitability that, as the service sector matures, its ability to maintain a linear trajectory of growth will diminish, however, the development of

services has buoyed the manufacturing sector and allowed it to continue to improve its productivity. In particular, the improvement in transport infrastructure, telecommunications and utilities have improved manufacturing productivity, whilst the development of information technology, marketing and sales expertise serve to improve demand and increase revenue (Mencinger 2003; Fernandes 2009; Bijsterbosch and Kolasa 2010).

Measuring service sector productivity in what is a heterogeneous environment is difficult, and there is a paucity of empirical work on the subject.

However, the growth of the service sector in the NMS, aided by in excess of 60% of FDI being invested, has transformed a sector marginalised in the era of a command economy to one capable of supporting a free market environment. The results indicate that the reform of the service sector, required as a condition of accession, has allowed the development of a vibrant sector which is converging with the EU15 in relation to its importance to GDP (Eschenbach and Hoekman 2006).

5.5 The Effect of EU Membership on Profitability

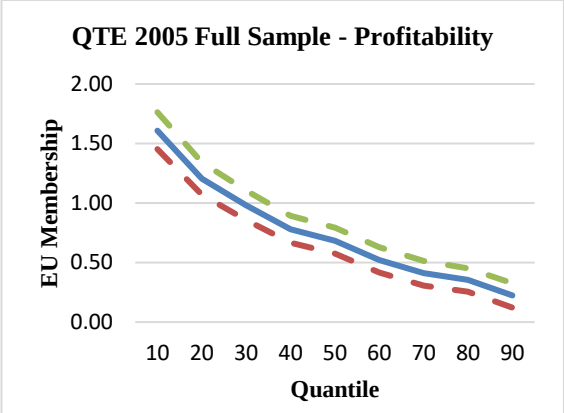
Profitability per worker is derived from the division of profit, measured as gross margin, by the number of employees. Productivity results measure output per worker, which is a measure of the efficiency of the workforce in transferring inputs into outputs. Profitability is determined, partially, from the productive efficiency of firms, but also on price cost margins, market power, monopolistic and oligopolistic power. For example, de novo firms entering the market against entrenched competition, may be in the highest percentile in the measure of productivity, but may elect to reduce prices in order to achieve a foothold in the market. There, in the context of EU membership and conditional upon key variables, the profit outcome may be different from the productivity outcome and may provide an additional perspective on firm performance.

Reference to Figures 5.2a to 5.2f below shows that the trend of declining coefficient values, seen in the productivity results, continues with those for profitability as the independent variable: this is the case across all sectors and both time frames, albeit with a flatter trajectory in the latter year. It can also be observed that coefficient values are higher at the lower end of the curve in 2005, across all sectors. In 2013, in both

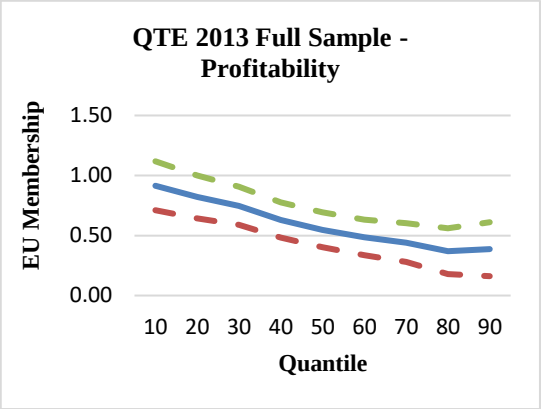
the full and manufacturing samples, the position changes in the manufacturing sector with coefficient values higher from the median upwards. This is not the case in the service sector, where the confidence intervals from the 80th percentile straddle zero indicating a lack of significance.

Figure 5. 3 2a to 2f. The effect of EU membership on Profitability across the Distribution Curve

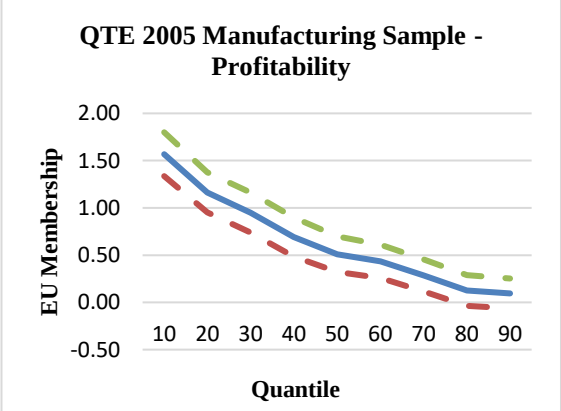
2a.



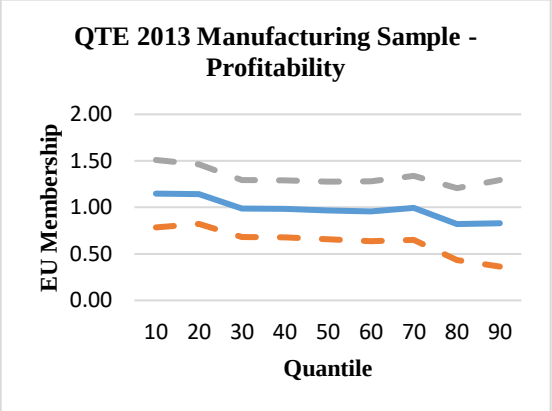
2d.



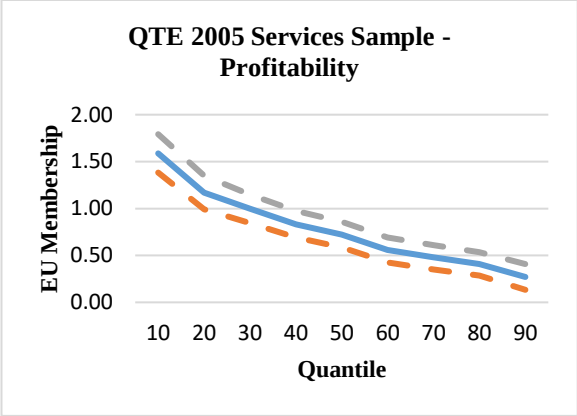
2b



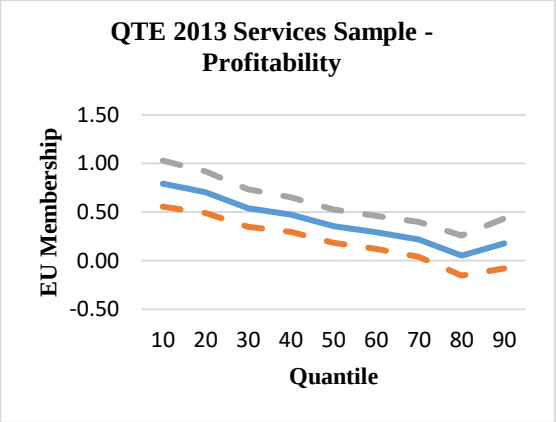
2e.



2c.



2f.



Source: Author

Table 5.2 below shows a summary of the productivity and profitability results across all sectors for both 2005 and 2013. The least productive and profitable firms (bottom 10%) have the highest coefficient values, with those for profitability being greater in 2005 and 2013 across all sectors.

This indicates that the least productive firms have not only improved their productive performance but capitalised on that by increasing profitability. In 2005, beyond the 10th percentile, coefficient values are lower in the profitability results, suggesting that the more productive firms sacrifice some profit to maintain market share and competitiveness. In 2013 there is a distinction between the manufacturing and service sectors, with the former showing a significantly higher coefficient value at the median and beyond, whereas the service sector tails away into insignificance at the 80th and 90th percentiles. This indicates that the manufacturing sector, buoyed by strong foreign ownership and exporting links, can capitalise on economies of scale, with the service sector beyond the median, not gaining as much traction. This may be a function of de novo firms continuing to establish themselves competitively at the expense of short term margin gains.

Table 5. 2 Comparison of the Results for Profitability and Productivity with EU Membership as the Independent Variables

		Full sample			Manufacturing sector			Service sector		
Independent variable	**Date**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**
EU membership (Productivity)	**2005**	1.484*** (0.046)	0.788*** (0.038)	0.377*** (0.044)	1.408*** (0.077)	0.798*** (0.067)	0.332*** (0.061)	1.530*** (0.059)	0.774*** (0.049)	0.389*** (0.064)
EU membership (Profitability)	**2005**	1.614*** (0.078)	0.693*** (0.055)	0.225*** (0.052)	1.627*** (0.117)	0.523*** (0.097)	0.093 (0.081)	1.583*** (0.104)	0.705*** (0.069)	0.273*** (0.068)
EU membership (Productivity)	**2013**	0.692*** (0.057)	0.544*** (0.037)	0.332*** (0.332)	0.956*** (0.080)	0.764*** (0.062)	0.592*** (0.100)	0.447*** (0.075)	0.389*** (0.049)	0.207*** (0.063)
EU membership (Profitability)	**2013**	0.918*** (0.103)	0.553*** (0.073)	0.396*** (0.114)	1.227*** (0.175)	0.994*** (0.158)	0.852*** (0.233)	0.781*** (0.122)	0.381*** (0.087)	0.172 (0.130)

Source: Author

It is not unreasonable to speculate that the least productive cohort are the survivors of an increasingly competitive market led by foreign firms entering the NMS' home market. In this scenario, by driving up productivity they have also driven up profitability, a logical outcome when a firm is forced to save costs, not only to remain competitive, but also to ensure survival. However, in a competitive environment, as firms move up the profitability distribution curve, it is possible that they are prepared to sacrifice some profitability gains to gain market share using pricing as a preferred tool. Equally, the sample contains a leavening of foreign owned firms engaged in IPNs and the export market and the level of foreign inputs, transfer price protocols and currency exchange, could have an adverse effect on profitability.

In the manufacturing sector, EU membership displays an interesting pattern in that in 2005 it has a strong showing up to the median, but tails into insignificance by the 90th percentile. In contrast, in 2013, strong growth in profitability, albeit declining slowly towards the most profitable firms, is observed across the curve with coefficient values higher than those seen in the productivity results. This would suggest that in 2005 the more profitable manufacturing firms are under greater pressure than illustrated in the full sample, gaining less or nothing from EU membership. There is evidence that

increased foreign competition causes price cost margins to fall (Tybout 2003) and this may affect the more profitable firms whose place at the top of the distribution curve may have been gained as a result of monopolistic or oligopolistic environments in the pre-accession period. It is not unreasonable to surmise that if firms in the top percentile were earning super normal profits prior to accession, the introduction of foreign competition, including from their own near abroad, would have forced a reduction in price and thus profitability to remain competitive. However, firms at the top of the distribution curve are likely to be foreign owned, involved in IPNs and therefore exporters which, by 2013, had consolidated their market power, thus protecting price cost margins. This appears to have been achieved despite using a high proportion of imported inputs and the potential distortions of transfer pricing, currency exchange and the reliance on labour as the only value added in the mix (Borocz 2012).

In 2005, the service sector EU membership result for profitability followed the trend of declining coefficient values from a high of 1.583 at the 10th percentile to a low of 0.273 at the 90th. In 2013, the results show a positive and significant profile from the 10th to the 70th percentile, with the 80th and 90th not significant. The coefficient values are significantly reduced and range from 0.781 at the 10th percentile to 0.227 at the 70th (99% C.I) indicating a slowdown of profit improvement gleaned from membership, with the top 20% of profitable firms showing no gain. The coefficient values are lower than those seen in manufacturing, which suggests that the service sector has regressed in its profit improvement programme whilst manufacturing has improved. Results indicate that in 2005 manufacturing and service sector productivity improvements were on a par and, although both suffered a decline in values, the service sector shows the greatest level of decline. Paradoxically, there is evidence that the reform and development of the service sector has improved firm level productivity and therefore, by definition, profitability (Arnold et al. 2011; Fernandes 2009). However, in relation to profitability, this is not substantiated beyond the median in these results.

It is important to acknowledge the key role played by institutional reform in the development of the service sector, creating a consequentially attractive environment for FDI. Unlike in the manufacturing sector, where the comparative advantage of cheap labour was the primary draw, in services the attraction was related to horizontal investment, predicated by the fact that in order to take advantage of the opportunities

offered, it was important to have a presence within the country's borders. This involved bringing expertise and technology, which allowed rapid improvements in both productivity and profitability. The results seen in 2005 indicate that the lead up to accession was when the greatest gains to profitability were made. This is not altogether surprising since there is evidence that service firms within the NMS became closer to convergence with the EU15 than those in manufacturing (Fernandes 2009). The degree of this convergence suggests that the service sector advanced more rapidly towards the production frontier than manufacturing firms and inevitably slowed as a result of the increasing proximity. It might also explain the lack of significance in the 20% of profitable firms which, by 2013, had achieved parity with those in the EU15. Furthermore, services tend to be labour intensive, difficult to automate and quality often demands increases to the labour force, which potentially impacts productivity and therefore profitability (Eschenbach and Hoekman 2006). It may therefore be concluded that the major influence is the institution of the EU itself and that strong institutional development, driven by an increasingly free market and enhanced by access to a market of 28 countries, is the main driver of both manufacturing and service sector profitability (Becker et al. 2010; Hartwell 2013).

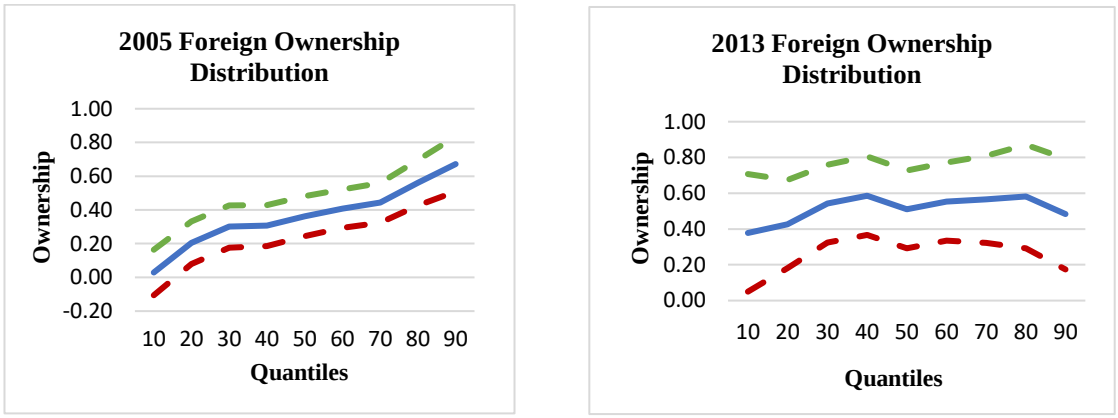
5.6 The Effect of Ownership on Productivity

The NMS experienced a significant influx of FDI up to and including the accession period; much of it emanating from countries within the EU15 that are geographically close, particularly Germany and Austria (Bussière et al. 2005). This investment relates particularly to the manufacturing sector and the desire of multinational firms to take advantage of the comparative advantage of cheap skilled labour whilst incorporating investee firms into international production networks (Martínez-Zarzoso 2011). Equally, the establishment of a market economy required a service sector to meet its needs; the skills required having been in short supply in an environment dominated by the controls of a command economy. This provided opportunities for Western European firms to meet the demands for skills and technology absent in this transitional phase of development (Eschenbach and Hoekman 2006).

Figures 5.3a and 5.3b show the productivity distribution for the full samples in 2005 and 2013. In the former there is a rising trend with the 10^{th} decile not being significant with the confidence intervals spanning zero. Thereafter, the graph shows the more

productive the firm the more it benefits from foreign ownership. In 2013 the picture is somewhat different, with a rising trend below the median whilst flattening somewhat thereafter.

Figure 5. 4 3a to 3b. The effect of Foreign Ownership on Productivity across the Distribution Curve



Source: Author

Table 5.3 below summarises the results for both foreign and domestic ownership for 2005 and 2013, including the disaggregation of the business sectors. Essentially, in 2005, foreign owners in the manufacturing sector gained traction only above the median, whereas the service sector, with the exception of the 10th percentile, is positively significant and on a rising trajectory: a result that is maintained in 2013. By 2013 the manufacturing sector's position has improved, with positive significance seen throughout the distribution curve, excepting the 90th percentile.

In relation to domestic ownership, the manufacturing sector is largely insignificant in both years with a suggestion, in 2005, of some traction just below the median, dissipating in 2013. In contrast the service sector is positively significant from the 30th percentile in 2005 but also dissipates in 2013. These results are discussed in greater detail below.

Table 5. 3 S Summary of the Results for Productivity with Foreign and Domestic Ownership as the Independent Variables

		Full sample			Manufacturing sector			Service sector		
Independent variable	Date	q.1	q.5	q.9	q.1	q.5	q.9	q.1	q.5	q.9
Foreign Ownership	2005	0.029 (0.069)	0.363*** (0.060)	0.672*** (0.083)	-0.025 (0.113)	0.175 (0.114)	0.526*** (0.123)	0.026 (0.094)	0.403*** (0.077)	0.635*** (0.105)
Domestic Ownership	2005	-0.083 (0.051)	0.090** (0.044)	0.211*** (0.059)	-0.159* (0.088)	-0.131 (0.090)	0.021 (0.101)	-0.142*** (0.052)	0.157*** (0.054)	0.293*** (0.072)
Foreign Ownership	2013	0.378** (0.168)	0.510*** (0.111)	0.484*** (0.158)	0.445** (0.222)	0.442** (0.183)	0.438 (0.277)	0.195 (0.230)	0.562*** (0.146)	0.540*** (0.197)
Domestic Ownership	2013	0.052 (0.143)	0.113 (0.096)	-0.090 (0.142)	0.080 (0.193)	0.126 (0.164)	-0.404* (0.226)	-0.167 (0.179)	0.111 (0.118)	0.030 (0.181)

Source: Author

5.6.1 The Full Sample

Reference to Table 5.3 above shows that foreign ownership in 2005 is positively significant from the 20th percentile, with a coefficient of 0.205 and, unlike the EU membership curve, rises to 0.672 at the 90th, indicating that the most productive firms have a threefold productivity gain over the least productive.

This result confirms the importance of FDI within the economies of the NMS, although it may also indicate that, at the higher end of the distribution curve, gains have been supported by improved managerial competence, the introduction of technology and membership of an international production network (IPN). The result for foreign ownership is an indication of the gains made by multinational enterprises (MNEs) investing in the NMS, taking advantage of cheap labour and a high degree of skill and adding technology and superior managerial skills (De Souza et al.2016). Equally, foreign entities were in large part integrated into international production networks (IPNs) and were therefore exporting intermediate or finished goods and taking advantage of the free trade market established for the NMS upon accession (Yi 2003). Whilst foreign ownership is positively significant in 2013 across the distribution curve, by contrast to the 2005 result where a rising coefficient value was seen with the most productive firms gaining the most, the results for 2013 are broadly flat (0.378 at

the 10th percentile and 0.484 at the 90th). This would suggest that foreign owned firms have consolidated their position over the intervening years and in terms of relative performance, a degree of equilibrium has been reached. This confirms the positive influence of FDI, which has been maintained despite the financial crises and the significant reduction in funds flow.

The result for private ownership, in 2005, is significantly positive at the 30th percentile (90% C.I) and from the 50th percentile onwards (95% to 99% C.I). As in the result for the foreign ownership variable, the coefficient is rising from the least to the most productive firms, albeit that the bottom 20% are not significant and appear to obtain no benefit. At the 30th percentile the coefficient is 0.085 and this rises to 0.211at the 90th. The coefficient values are smaller than for foreign ownership, indicating that domestic firms gain less in productivity growth. However, these results for private ownership may indicate that the anticipated spillover effects for domestic firms have materialised, which is particularly true at the top end of the curve where the most productive firms have gained the most. This may be particularly applicable in sectors with a significant degree of intermediate inputs related to the IPN's, with upstream domestic suppliers servicing the core MNE entity (Javorcik 2004).

The results support the hypothesis that foreign firms are more productive than domestic ones and the proximity of their business connections support the gravity theory of trade. Equally, the results for the more productive domestic firms suggests an element of spillover being obtained and support Javorcik's (2004) claim of benefits to local upstream suppliers with connections to foreign affiliates.

Excepting 40th percentile (significant 90% C.I), private domestic ownership results in 2013 are not significant. To some degree the result correlates with that seen for firm size around the median, which may reflect similar business profiles. However, in contrast to 2005 when domestic firms were gaining traction, these results suggest they have now reached an optimal efficiency and are no longer making progress in relation to productivity. This may be a result of the financial crises which has stunted demand and, in some countries of the NMS, forced significant fiscal contractions. Whilst foreign firms are able to rely on powerful parents, domestic firms have to rely on a banking system dominated by foreign banks who themselves were forced to curtail their activities to repair their own domestic balance sheets.

5.6.2 The Manufacturing Sample

Foreign owned firms are more productive than their domestic counterparts and have a greater propensity to export and this is particularly the case within the manufacturing sector. Additionally, in the NMS, FDI has driven productivity improvements, albeit that the results are dependent on the existence of absorptive capacity (Bijsterbosch and Kolasa 2009).

The results for foreign ownership show that, with the exception of the 20th percentile (95% C.I), it is positive and significant only at the top end of the curve. The solitary appearance of a positively significant result at the 20th percentile may reflect the fact that, whilst the majority of FDI went into the more capital intensive sector, aimed at membership of IPNs and the export market, a proportion went into the less productive segment serving domestic markets. This may be the distinction between horizontal FDI, which is market seeking, and vertical FDI, which is centred on the relative endowments of factors of production. The former is attracted to domestic suppliers at the lower end of the productivity curve whilst the latter is more likely to be focussed on exports and IPNs. The coefficient values conform to literature, in that at the 20th percentile the value is 0.258, whereas beyond the median it rises from 0.359 at the 60th percentile to 0.526 at the 90th. Hence, the more productive the firm the greater the productivity improvement. The result may also indicate that it is only the most productive firms that are involved in IPNs and exporting. Equally, the lack of significance at the median and below indicates that there may be, within the manufacturing sector, a dichotomy between firms investing into IPN's and those seeking the advantages of increasing demand in domestic market economies, with the latter not necessarily achieving the productivity gains of the former due to the delay in transitioning from a command to a market economy.

The rising coefficient for the foreign ownership result indicates that firms at the top of the curve gain a greater level of improvement, reflecting the fact that the more productive foreign firms self-select into FDI and are more likely to have invested in firms at the head of the productivity curve. This conforms to the Melitz (2003) model and is confirmed in Beck et al. (2005). Furthermore, there is evidence that foreign firms gain the greatest benefit from the structural reforms brought by EU accession, (Cuervo-Cazurra and Dau 2009) and have the greater propensity to export, implying

that they are amongst the most productive (LiPuma et al. 2013). Equally, Kneller (2005) found that absorptive capacity and distance influenced firm performance. These results indicate that the NMS had the skill base required to meet the challenge of new technology and, since the majority of FDI into the NMS is from countries adjacent to them, distance may be a factor.

In 2013, foreign ownership is positively significant (90% to 99% C.I) up to the 90th percentile where it becomes insignificant. The result is more positive than in 2005, when, with the exception of the 20th percentile, positive and significant results were only seen beyond the median. The consistency of the 2013 result across the distribution curve, indicates that foreign firms are now well established in the NMS and are taking advantage of their experience, management expertise and technology, and may also indicate an improvement in absorptive capacity enabling the least productive firms to achieve improvements. It may also be the case that foreign firms, horizontally invested, have succeeded in transforming the privatised, domestic firms into viable entities with the introduction of improved management and technology.

The not significant result at the 90th percentile is difficult to interpret but may be confirmation of the results for age and size, that firms at the top end of the curve have reached optimal productivity within the context of their environment.

In relation to domestic ownership, the results confirm evidence from this research and the overwhelming view in literature, that foreign owned firms are more productive than indigenous companies (Beck et al. 2005; De Rosa et al 2010). This is illustrated by the muted results for domestic ownership, which are negatively significant in 2005 at the 10th percentile (90% C.I) and not significant thereafter. This indicates that, in the manufacturing sector, outside foreign ownership, domestic firms have failed to capitalise on the advantages of EU membership and contrasts with the service sector, discussed in the next section, which is significantly positive across most of the distribution curve. The results therefore suggest that the anticipated spillover from the introduction of foreign competition and FDI did not materialise as far as domestic firms are concerned. The result chimes with findings in literature, which suggest that any spillovers were limited to domestic firms with upstream supply chain connections to MNEs and, even in this case, there is evidence that foreign suppliers were encouraged to purchase or establish upstream entities to ensure quality and conformity

(Hunyar and Richter 2011, Bucar et al. 2009; Javorik 2004; Humphrey and Memedovic 2003; Markusen and Venables 1999).

In 2013 private ownership is positively significant (90% to 95% C.I) at the 30th and 40th percentiles and negatively significant (90% C.I) at the 90th. Other results are not significant. This would suggest that firms just below the median are enjoying sectoral benefits which this research is unable to identify. The result at the top end of the curve may be a reflection of the pressure of FDI on the more productive domestic companies from foreign imports crowding out firms unable to compete. It may also suggest that, for the most productive firms, the anticipated spillovers from FDI have not materialised, or that absorptive capacity has prevented private domestic firms from taking advantage of any gains that may have been made (Damijan 2012; Havranek and Irsova 2011; Kneller 2005). Another aspect of the failure of domestic manufacturing firms to capitalise on EU membership is that of a lack of absorptive capacity as a result of institutional failure. There is evidence that the NMS competed strongly to attract FDI and in so doing, geared taxation and infrastructure policies to benefit foreign firms. This resulted in the diversion of funds from education, research and development and incentives for domestic firms to the needs of the MNE.

The result was a lack of development of an indigenous manufacturing sector with the MNEs maintaining a disproportionate influence on national economies. Kneller (2005) found that any relationship between domestic firms and foreign technology was dependent on absorptive capacity, and Furman et al. (2002) suggested that countries needed to develop a combination of absorptive capacity, technology diffusion and market demand, whilst Radosevic (2002) suggested that a supply and demand curve in equilibrium was an important component in the promotion of these three ingredients. The limited economic growth and the fiscal constraints that ensued may well have contributed to a failure to develop a vibrant domestic manufacturing sector (Innes 2014).

5.3.3 The Service Sector Sample

In 2005, with the exception of the 10th percentile, foreign ownership is positively significant with the coefficient value rising steeply from 0.238 (20th percentile) to 0.635 (90th percentile), confirming that the most productive firms gain the greatest

benefit from FDI. The results contrast favourably with the manufacturing sector, where a greater number of significant percentile scores and a higher coefficient value indicate that services have benefitted greatly from foreign expertise and technology. The service sector attracts the largest share of FDI, 60.5% in 2004, motivated by the underdeveloped nature of the sector allied to the opportunity of contesting the infrastructure market (BEEPS 2005). The introduction of FDI has brought improved management and new technology, confirming that the results seen in the full sample (table5.2) are largely the result of the successful development of the service sector and confirm that services outperform manufacturing (Eschenbach and Hoekman 2006). This is also evident from the universally negative results for the sector dummy (1 = manufacturing, 0 = services) indicating that services are both more productive and profitable than manufacturing. There is also evidence that service sector FDI promotes productivity improvements in domestic firms, which supports the results for privately owned firms observed in Table 5.2 (Damijan et al. 2015).

In 2013 the result is positively significant (95% to 99% C.I) from the 20th percentile with an increasing coefficient value; a result identical to 2005. However, the 2013 result indicates that the coefficient values are greater between the 20th and 80th percentile indicating that, other than for the most productive firms, the foreign owned service sector continues to improve productivity some six to eight years after accession. The lack of significance in the 10th percentile may indicate that investors in the least productive firms are finding difficulty with absorptive capacity (Kneller 2005). The lack of significance at the 90th percentile may imply that this cohort of firms has already achieved productivity convergence with the EU15. Beyond the median, in contrast to manufacturing, the service sector has a higher coefficient value, whereas, the reverse is true below the median. This is possibly an indication of the progress made by foreign firms entering an underdeveloped market, introducing management know how and technology to support an increasingly liberalised market. The improving service sector standards also created an environment which improved productivity in the downstream manufacturing sector, whilst building an export market to compete with the Asian and South American tigers (Eschenbach and Hoekman 2006; Fernandes 2009). It also suggests that, despite the reduction in capital flows following the financial and Eurozone crises, FDI continues to dominate the sector.

In 2005, the result for privately owned firms shows that, with the exception of the 10th and the 20th percentiles (the former negative and significant, 99% C.I, and the latter not significant), the other results are significant and positive (90% to 99% C.I). Fernandes (2009) found that the information and communications technology sectors and those utilising skilled labour, exhibit a propensity to be more productive, equally, those more distant from the production frontier benefitted from the deregulation and trade liberalisation encouraged by the accession process. This in turn has led to the NMS becoming successful service exporters (Fernandes 2009; Kandilov and Grennes 2010). In contrast to the results for the manufacturing sector, where domestic firms appear to have little advantage from spillovers, services appear to have benefitted from the introduction of foreign management and technology; the coefficients values rising from 0.130 at the 30th percentile to 0.293 at the 90th, indicating that the most productive firms gain the most. Given the negative or not significant nature of the results relating to age and size of firm and the underdeveloped nature of the service industry in the period of Soviet hegemony, it is not unreasonable to speculate that the development of a market orientated sector would need to attract new firms with different skill sets. D'Souza et al. (2016) found that privatised firms, by definition older and larger, had an inferior performance record relating to sales, employment growth and labour productivity and suggested that this was in part due to the fact that the profit motive was organic as opposed to acquired.

The hypothesis that foreign firms in the service sector are more productive than all other categories of firms, is accepted on the basis of these results. It is clear that domestic firms, at least in 2005 and particularly at the higher end of the distribution curve, are benefitting from foreign competition and technological spillovers and contributing to the building of a more vibrant sector than seen in manufacturing. In contrast to 2005, where the results for private ownership were significant and positive from the 30th percentile, no significance is found in 2013 across all percentiles. Given the strength of the burgeoning service sector post accession, this is a rather surprising result, although it may be that there is a two-tier effect at work with foreign owned firms benefitting from improved technology and management, crowding out domestic firms by their superior quality and performance. Evidence also exists of a lack of intersectoral spillovers to domestic firms, particularly from MNEs involved in the IPNs, which may also contribute to the lack of significant results (Javorcik 2004).

5.7 The Effect of Ownership on Profitability

Reference to Table 5.4 below indicates that in 2005 there are few points of difference between the productivity and profitability foreign ownership results with the manufacturing sector, indicating that, beyond the median coefficient, values are slightly higher in terms of profitability whilst the opposite is true of the service sector. In 2013 the position is reversed. From the 20th percentile in the service sector, profitability achieves higher coefficient values whereas manufacturing becomes largely insignificant. However, within manufacturing there are very high coefficient values of 1.134, 1,631 and 1.242 at the 10^{th}, 20^{th} and 80^{th} percentiles suggesting some sectoral influences. Overall coefficient values in 2013 have improved in the service sector whereas, outside the percentiles observed in the manufacturing sector, the profit position is not improving.

In 2005, domestically owned firms in the manufacturing sector were negatively significant at the bottom end of the distribution curve and otherwise not significant, which broadly conforms to the result for productivity. In contrast, the service sector broadly mirrors the productivity results with positively significant coefficients from the 60^{th} percentile, albeit at significantly reduced values. In 2013, service sector results are not significant, which mirror those for productivity and, whilst those for the manufacturing sector are also broadly not significant, there is a notable exception at the 20^{th} percentile where a high (1.138) positively significant coefficient value is observed. This is a similar value to that seen at the same percentile for foreign ownership, which confirms the suggestion that a particular manufacturing sub sector has achieved significant profitability growth, but with no evidence of similar progress in productivity.

Table 5. 4 Comparison of the Results for Productivity and Profitability with Foreign and Domestic Ownership as the Independent Variables

		Full sample			Manufacturing sector			Service sector		
Independent variable	**Date**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**
Foreign Ownership (Productivity)	**2005**	0.029 (0.069)	0.363*** (0.060)	0.672*** (0.083)	-0.025 (0.113)	0.175 (0.114)	0.526*** (0.123)	0.026 (0.094)	0.403*** (0.077)	0.635*** (0.105)
Foreign Ownership (Profitability)	**2005**	0.086 (0.113)	0.350*** (0.079)	0.617*** (0.104)	-0.135 (0.158)	0.236 (0.148)	0.686*** (0.131)	0.276* (0.151)	0.412*** (0.099)	0.368*** (0.124)
Domestic Ownership (Productivity)	**2005**	-0.083 (0.051)	0.090** (0.044)	0.211*** (0.059)	-0.159* (0.088)	-0.131 (0.090)	0.021 (0.101)	-0.142*** (0.052)	0.157*** (0.054)	0.293*** (0.072)
Domestic Ownership (Profitability)	**2005**	-0.223** (0.104)	0.018 (0.061)	0.089 (0.073)	-0.358*** (0.119)	-0.152 (0.123)	-0.004 (0.102)	-0.099 (0.125)	0.103 (0.072)	0.164* (0.086)
Foreign Ownership (Productivity)	**2013**	0.378** (0.168)	0.510*** (0.111)	0.484*** (0.158)	0.445** (0.222)	0.442** (0.183)	0.438 (0.277)	0.195 (0.230)	0.562*** (0.146)	0.540*** (0.197)
Foreign Ownership (Profitability)	**2013**	1.033*** (0.382)	0.929*** (0.271)	0.655 (0.456)	1.134** (0.535)	0.778 (0.618)	0.273 (0.726)	0.643 (0.401)	0.906*** (0.305)	0.878* (0.514)
Domestic Ownership (Productivity)	**2013**	0.052 (0.143)	0.113 (0.096)	-0.090 (0.142)	0.080 (0.193)	0.126 (0.164)	-0.404* (0.226)	-0.167 (0.179)	0.111 (0.118)	0.030 (0.181)
Domestic Ownership (Profitability)	**2013**	0.331 (0.354)	0.180 (0.241)	-0.361 (0.421)	0.589 (0.485)	-0.000 (0.577)	-0.385 (0.684)	-0.071 (0.357)	0.194 (0.276)	-0.226 (0.459)

Source: Author

5.7.1 Foreign Ownership

In 2005, in foreign owned firms, points of difference between productivity and profitability are small, but there are some observations which merit discussion. Beyond the median, the manufacturing sector shows that the most productive firms show the greatest profit improvement with the top 20% having a higher coefficient value. This suggests that the most profitable manufacturing firms are able to consolidate their position by taking advantage of improved productivity and increasing price cost margins. Assuming a relationship between productivity and profitability, this indicates that the more technological and managerial improvements are introduced, the more profitable firms become. This conforms to literature with foreign firms introducing improved management and technology (Bijsterbosch and Kolasa

2010), although host countries had anticipated that FDI would result in technological and efficiency spillovers. Foreign owned firms are also more likely to be part of IPN's and their profits influenced by the quantity of foreign inputs, allied to the restriction of value added to the labour content. Additionally, margins may be influenced by currency and internal transfer pricing protocols. This may lead to lower profits than might have been anticipated given the strength of their productivity coefficient. Therefore, it is also possible that the most productive firms may be in the lower half of the profitability distribution curve.

The service sector also has higher values below the median, becoming lower as they rise up the distribution curve. In contrast to manufacturing, this would suggest that the more profitable firms in the service sector are having to sacrifice margin to maintain competitiveness and develop what is a burgeoning market. Failure to capitalise on productivity performance is an indication of the competitive pressure on price cost margins in a comparatively new market sector. There is evidence that the influx of foreign firms, the need for new technology and management expertise in support of a market economy, significantly increased productivity. In relation to domestic firms, they have benefitted from foreign induced infrastructure and telecommunications improvements with the advantages of better access to technology and managerial expertise. The manufacturing sector suffered from a greater degree of vertical integration within MNE supply chains resulting in a limited spillover effect.

Evidenced by its share of FDI, foreign ownership has clearly extended to the service sector.

> *"At the end of the year 2009, services accounted for 67.5% of total inward FDI stock in the Central East European NMS; business services amounting to the highest share of 19.4%, followed by finance with 18.8%, trade 13.1%, transport, storage and communications 6.8%, electricity, gas and water supply 5.8%, construction 2.5%, and all other services with a share of 1.1%"* (Hunya 2011).

This is potentially important since it is evidence of the influence of FDI, beyond the service sector, as a contributor to improved profitability in manufacturing and to the development of service sector exports.

In 2013 foreign owned firms have higher profitability coefficient values than seen in productivity, and this is particularly the case for the service sector which has driven the overall results. The result is confirmation of the significant investment of FDI into the NMS service sector amounting to in excess of 60% of the total, resulting in both productivity and profitability improvements across the services distribution curves (BEEPS 2005; Eschenbach and Hoekman 2005).

There is also evidence that FDI into the service sector improves the productivity of domestic firms permeating into the manufacturing sector enhancing productivity growth by 0.16% (Damijan et al. 2012).

In contrast, for the first time in this series, manufacturing foreign ownership results are showing signs of faltering with positive significance only at the 10th, 20th and 80th percentiles and not significant in the balance. This indicates that productive efficiency does not necessarily result in a concomitant result for profitability. It does however suggest that, following the financial crises, the weak demand has caused all firms, including those that are foreign owned, to reduce prices in order to maintain volume, putting pressure on price cost margins, particularly around the median of the distribution curve. This is not surprising since FDI in the manufacturing sector was aimed at expanding firms' IPNs with outputs destined primarily for the EU15. With demand substantially reduced as a result of the Eurozone crisis, price cost margins were inevitably going to suffer.

Where results are significant, the coefficient values are large and two of the three results are at the bottom end of the distribution curve. The high coefficient value of the more profitable firms at the 80th percentile, suggests that larger firms at the top of the distribution curve continue to take advantage of economies of scale, network effects and possibly market power. The 90th percentile result is insignificant for both profitability and productivity, which may indicate a closer proximity to the production frontier. At the lower end of the chain, the results are less intuitive and suggest a possible industry or sector effect. The coefficient values are large at the 10th (1.134) and the 20th (1.631) percentiles and, whilst this conforms to results seen throughout the research where least profitable firms see the greatest benefit, in the context of recovery from the financial crises, the result defies expectation. One can only speculate that the more labour intensive firms, operating in a horizontal FDI market,

have crowded out domestic competition and are enjoying monopolistic or oligopolistic market power. It also demonstrates the heterogeneity of the sample, evidenced by the positive results towards the bottom of the distribution curve. The significant level of FDI was primarily directed at privatised firms with little evidence of greenfield investment (Eschenbach and Hoekman 2006). These new foreign owners brought lower prices, better quality and product innovation (Arnold et al. 2011; Fernandes and Paunov 2012). This inevitably put pressure on incumbent firms having consequences for productivity and profitability.

5.7.2 Domestic Ownership

In relation to domestic ownership, overall productivity results for 2005 are not carried through into profitability, albeit that it should be recognised the positive and significant results achieved for productivity resulted from services rather than manufacturing sector performance. The profitability results are largely not significant with only the 10th and the 80th percentile showing any significance, the former negative and the latter positive. More can be observed from the sector results. Manufacturing barely features, with negative significance seen only in the bottom 20% of both the productivity and profitability distribution curves, suggesting that the least productive and profitable lose ground as a result of EU membership and there appears to be no effect on the balance.

Conversely, service sector firms beyond the median capitalise on productivity improvements by increasing profitability, albeit, at a lower coefficient value. Since the results for age and size of firm are largely negatively significant or insignificant, this would suggest that it is being driven by de novo firms enjoying both an export boom and the benefits of supporting a liberalised market (De Souza 2016).

In 2013, in relation to domestic ownership, there is little of significance in the results across all sectors. Within the manufacturing sector and only at the 20th percentile is there a significant result, although at a very high coefficient value (1.138). Given that the result is at the same percentile seen for foreign ownership, this may indicate some degree of horizontal investment with spillover to domestic firms operating in the same market segment. A speculative assessment suggests a relationship to significant FDI into the supermarket sector within the NMS, providing the opportunity of spillover to the domestic agricultural sector. There is some evidence that, for example, small dairy firms have taken advantage of vertical coordination processes and gained access to

higher value markets (Dries et al. 2004; Dries and Swinnen 2004) and further research might provide answers.

Domestically owned manufacturing firms have found difficulty achieving the same benefits as foreign and state-owned firms. There is evidence to suggest that firms acquired by foreign owners improve productivity and show improvements in the use of labour and capital intensity (Damijan et al. 2012). This would imply that domestic firms, possibly because of importation competition or the paucity of technological spillovers, fail to achieve the same improvement in profitability.

Possible further explanations include competition entering the domestic market from more efficient foreign firms putting pressure on price cost margins, a lack of a spillover premium from FDI and a limitation to absorptive capacity. This could result in a possible crowding out effect, allied to the potential lack of technological spillovers from the volume of FDI coming into the NMS (Javorcik 2004). There is evidence that import competition results in reduced domestic volume and the creation of negative economic profits, thus putting pressure on price cost margins (Tybout 2001).

Equally, domestic firms are more likely to be at the more labour intensive and lower value-added segment of the sector, where productivity and profitability profiles are inferior to those of technology based firms, indicating that, as in manufacturing, private domestic firms are not gaining as much traction as foreign and state owned firms.

The evidence on spillovers is mixed. Javorcik (2004) found a positive benefit in Lithuania but Konings (2001) found a negative effect in Bulgaria and Romania and similarly, Damijan et al. (2001) in a number of Central and Eastern European countries. There is evidence that the benefits of FDI depend on the absorptive capacity of the host country's firms and the level of human capital available (Damijan et al. 2001; Kneller 2005). In this study, data records that 86% of firms had at least one graduate and 48.8% had in excess of 25%, suggesting that human capital at least was not a restriction. The other factor, particularly in relation to SMEs, is the apparent market failure surrounding access to finance. This research has consistently demonstrated the improvement seen in both productivity and profitability for those in receipt of loans and, since in 2013 only 37% of all firms and a third of SMEs were

recipients, this may be a further explanation for the apparent failure of domestic firms to gain any advantage from EU membership.

5.8 The Effect of Exports on Productivity

A graphical illustration is not included here due to the broadly flat or insignificant nature of the results. Reference to Table 5.5 below indicates that, within the full sample in 2005, exporting firms achieved a productivity premium. However, an analysis of the disaggregated results show that this was driven by the service sector with manufacturing displaying no traction. In 2013 the position had deteriorated. Only the top 10% of firms in the full sample continued to enjoy a premium, with the service sector becoming not significant and manufacturing, below the median, actually falling into negative territory.

Table 5. 5 Summary of the Results for Productivity with Exports as the Independent Variables

		Full sample			Manufacturing sector			Service sector		
Independent	**Date**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**
Export	**2005**	0.002*** (0.001)	0.002*** (0.001)	0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.006*** (0.002)	0.006*** (0.001)	0.003** (0.001)
Export	**2013**	-0.001 (0.001)	-0.000 (0.001)	0.002* (0.001)	-0.003*** (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.000 (0.002)	0.001 (0.001)	0.002 (0.001)

Source: Author

5.8.1 The full Sample

Literature indicates that the most productive firms have the greatest propensity to export and firm level data indicates that only a small fraction of the most productive firms are responsible for the majority of exports (EFIGE, 2011). This would also appear to be the case in Eastern Europe where studies in the Visegrad countries indicate that the greater the labour productivity the more likely is a firm to export (Cieślik 2012; Michałek 2013a; Michałek 2013b). Additionally, foreign owned firms showed a greater propensity to export than domestic firms (Campos and Coricelli 2002).

The results in 2005 show that the influence of exporting is positive and significant (95% to 99% C.I) across the distribution curve, except for the 20th percentile, and

there is a broadly uniform coefficient value of 0.002. The significantly positive result across the distribution curve indicates that those firms which export benefit, with an increase in productivity.

However, the low coefficient indicates that the effect is marginal, and this pertains regardless of the position along the distribution curve. There may be a number of reasons for this result. Firstly, the gap between the most and least productive exporters may be very narrow and therefore any exporting effect has a degree of equivalence across the distribution curve. Secondly, if evidence from literature is accepted, that exporting firms are amongst the most productive, their proximity to the production frontier limits the potential for productivity improvements (Girma et al. 2004). Thirdly, the major exporters from the NMS are foreign owned firms involved in IPN's, and their motivation for an Eastern European facility is the comparative advantage of cheap labour utilising, in the manufacturing process, a high degree of foreign inputs. Therefore, the potential for significant added value is limited to labour, thus reducing price cost margins, and when allied to issues of transfer pricing and currency, this diminishes the opportunity to increase substantially output per worker. Equally, an element of localism may be a contributing factor, as the gravity model suggests that distance to market is an important element of a firm's export propensity, and the elimination of tariff barriers in these firms' near abroad (other NMS), may have resulted in a greater propensity to export to these countries (Bussière et al. 2005). This element of an export market would not necessarily have had any measurable effect on productivity.

The results in 2013, are more nuanced being negatively significant (95% C.I) in the 20th and 30th percentiles and positively significant (90% C.I) in the 90th. The assumption is that, in this particular distribution group, all are productive firms otherwise they would not be exporters. A further assumption is that those in the 90th percentile are likely to be MNEs within an IPN. Therefore, in 2013, it is only in the most productive firms where exports improve productivity, and these firms are likely to be foreign owned. Based on firm-level data, there is empirical evidence that only a small minority of firms at the top end of the curve account for the majority of exports, (EFIGE, 2011) but in contrast to 2005, firms in this cohort at the lower end of the distribution curve show that the effect of exporting is either negative and significant

or not significant. These results may reflect the effect of both the global and Eurozone crises and the resulting economic downturns.

The MNEs at the 90th percentile of the distribution curve are more likely to be capital intensive operations able to control output and coordinate this with demand. However, exporters at the lower end of the curve may be domestic operators and labour intensive. This may result in an inability to reduce labour to an optimal level, given production demands or labour hoarding.

The results for exports in 2013 do not support a universal acceptance of the hypothesis that exporting improves productivity, although consistent with evidence that the most productive firms gain optimal advantage.

5.8.2 The Manufacturing Sample

In 2005, with the exception of the 30th percentile which is significant and negative (95% C.I), the result for manufacturing exporters is not significant. This implies that exporting appears not to contribute to manufacturing productivity improvement, which initially seems counterintuitive. However, it has become a stylised fact that it is the more productive firms that have the greatest propensity to export and therefore the act of exporting may not improve productivity (Wagner 2012).

The result may support the Melitz (2003) model as these firms have self-selected as exporters because of their high position along the productivity distribution curve, suggesting that they are so close to the production frontier, or at least that which is concomitant with the extant standards of the NMS, that no further movement is possible. In 2016 circa 82% of goods produced by the NMS were exported to the EU (Eurostat DS-018995 2017). Bellone et al (2010) found that there was no exporter premium for intra-European exporters, Damijan and Kostevc (2006) suggested that firms experience a once only productivity improvement in the first year of exporting and Yashiro and Hirano (2010) concluded that only firms who are primarily global exporters, achieve a significant productivity premium.

Within the manufacturing sector a significant percentage of exports are from foreign owned MNE's, using the NMS as part of their IPN, bringing with them a significant element of extra national inputs and leaving only labour to provide the value added.

This implies that these inputs do not add significant value to the process and, if it is only cheap labour providing any productivity boost, it is likely to be lost in the price cost ratio and the opportunity for an export multiplier.

The domination of imported material in the assembly process not only impacts the export multiplier, but also reduces the opportunity for forward and backward linkages with upstream and downstream firms as a result of MNE's restricting activity to specific processes (Palma 2005).

In relation to the hypothesis that exporters, particularly those that are foreign owned, are more productive and profitable within the EU, there is no evidence from the results to allow such a conclusion to be drawn. Evidence from literature, allied to a lack of significance in the results published in this section, provides a plausible argument that exporting does not necessarily improve the productivity of the already efficient exporter. This result may be idiosyncratic in that Girma et al. (2004) found that exporting boosted productivity in UK firms, although the point of difference may be the size of foreign inputs utilised in foreign owned firms within the NMS. allied to transfer pricing protocols geared to benefit the MNE.

In 2005 exporting firms were negatively significant only at the 30th percentile, with no significance being seen across the rest of the distribution curve.

However in 2013, exporting firms have negative and significant coefficients (90% to 99% C.I) from the 10th to the 60th percentile, with the bottom 20% of firms showing the greatest fall in productivity. Beyond the 60th percentile, the results are not significant. The effect of the financial and Eurozone crises had a significant and negative effect on firms reliant on IPNs to maintain continuity of business. From both the Czech and Slovak automotive industries there is evidence of detrimental impact on volume and profits, including the upstream supply chain. This would have further impacted the already low value-added contribution previously noted in this chapter (Pavlínek 2015; Gereffi 2014). It is therefore probable, in this environment, with reduced demand in Western Europe, that all exporters would not be operating at optimal capacity and were unable or unwilling to reduce the workforce to maintain productive capacity. The least productive suffered the most attrition, with the more productive firms surviving the crisis without any apparent loss of productive

efficiency. This may be a function of such firms being the most capital intensive with a minimal workforce.

5.8.3 The Service Sector Sample

In 2005 exports are positively significant (95% to 99% C.I) over all percentiles, confirming the growth of export markets within the service sector. The coefficient value is stronger below the median rather than above, with 0.006 at the 10th percentile rising to 0.009 at the 30th, before declining to 0.003 at the 90th. This lack of uniformity across the distribution curve is possibly a sectoral issue related to the heterogeneity of firms where the more labour intensive, which are likely to be in the lower segment of the distribution curve, gain from technological improvements, whilst the more capital intensive technology firms have a limited capacity to improve productivity.

The reformation of the service sector has been a success. The NMS are now amongst the largest exporters to the EU15 and competitive against other suppliers across the world. Part of the comparative advantage rests with the gravity theory, (distance to market) although the quality of the institutional environment is also an important dimension providing an advantage over Asian and South American competitors (Kandilov and Grenne 2010). Essentially, evidence points to the fact that distance to market, allied to the similarity of times zones, was an important determinant of the attraction of NMS service exporters. Of equal standing is the importance of institutional quality, particularly the rule of law, with adherence to the *Acquis Communautaire* amongst the NMS being pivotal to the success of service exporting firms (Kandilov and Grenne 2010).

In contrast to the manufacturing sector, the hypothesis that exporting firms are more productive is borne out by these results. The positive significance of the result for domestic firms, described in the previous section, suggests that export success in the service sector may well have permeated through to domestically owned firms benefitting from positive spillovers. Drawing further on the results for the firm characteristics of age and size, it may also be possible to deduce that, in this sector it is de novo firms that are at the forefront of this development (Kandilov and Grenne

2010; D'Souza et al. 2016). The results for exports in 2005 were significant across the distribution curve whereas, in 2013, no significance is observed.

This result is counter intuitive as MNE service exports have been a feature of international trade from the region, albeit mainly to the EU15. However, this result may not be altogether surprising. Greenaway and Kneller (2007) found that improved productivity was higher for new exporters, which would have been the case for the NMS service sector in 2005, although the effect was short lived, thus explaining the lack of significance in 2013. There is also evidence that exporters relying primarily on the EU do not benefit from an exporter premium and, if any exists, it is confined to the highest productivity percentiles (Bellone et al. 2010). Similarly to the manufacturing sector, firms exporting to the EU, in addition to NMS, experience only a one-time productivity improvement in the year after they begin to export and only worldwide exporters enjoyed significant advantage in productivity growth. (Damijan and Kostevc 2006; Yashiro and Hirano 2010) find the results obtained appear consistent with these findings.

5.9 The Effect of Exports on Profitability

Reference to Table 5.6 below indicates that in 2005 productivity was positively significant at only the 10^{th} and 30^{th} percentiles, albeit that this result was driven by the lack of significance in the manufacturing sector. This outcome is reflected in the profitability result with negative coefficients at the 10^{th} and 30^{th} percentiles. In contrast, the service sector result for both productivity and profitability is positively significant across the distribution curves, both with high but reducing coefficient values.

In 2013 the profitability results are driven by the manufacturing sector. The full sample shows a positive and significant result from the 50^{th} percentile, despite a lacklustre performance in relation to productivity. In relation to productivity, both sectors are either negative (manufacturing 10^{th} to the 60^{th} percentile) or not significant (services) and mirror the profitability results of services with the exception of the bottom 20% of firms that are actually negatively significant. Manufacturing is positively significant around the median and at the 90^{th} percentile.

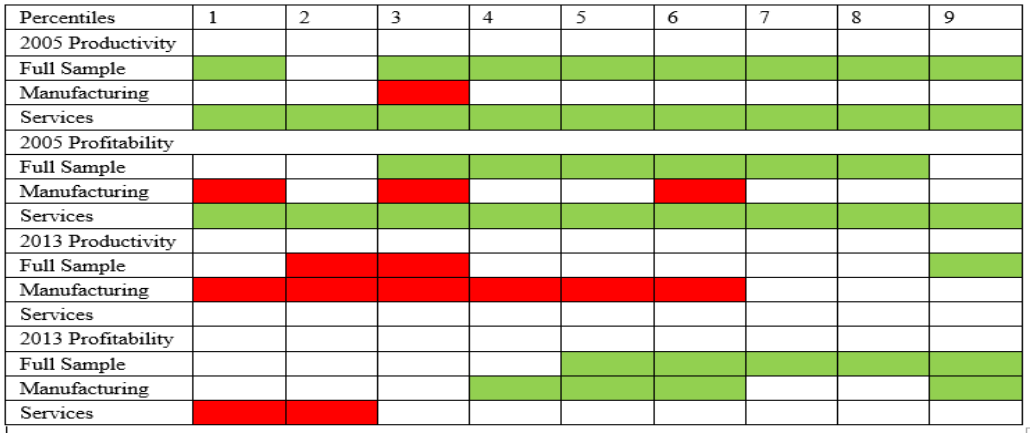
Table 5. 6 Summary of the Results for Profitability with Exports as the Independent Variable

		Full sample			Manufacturing sector			Service sector		
Independent variable	**Date**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.9**
Export (productivity)	**2005**	0.002*** (0.001)	0.002*** (0.001)	0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.006*** (0.002)	0.006*** (0.001)	0.003** (0.001)
Export (profitability)	**2005**	-0.000 (0.001)	0.002** (0.001)	0.001 (0.001)	-0.003* (0.002)	-0.001 (o.001)	0.000 (0.001)	0.008*** (0.002)	0.006*** (0.001)	0.005*** (0.002)
Export (productivity)	**2013**	-0.001 (0.001)	-0.000 (0.001)	0.002* (0.001)	-0.003*** (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.000 (0.002)	0.001 (0.001)	0.002 (0.001)
Export (profitability)	**2005**	-0.002 (0.002)	0.004** (0.002)	0.004* (0.002)	-0.002 (0.003)	0.005** (0.002)	0.008** (0.004)	-0.007** (0.003)	0.002 (0.002)	0.004 (0.004)

Source: Author

Reference to figure 5.4 below provides a schematic of the overall influence of exporting on the manufacturing and service sector. It is self-evident that in 2005 both productivity and profitability was driven by the service sector with universal success in increasing performance across the distribution curves. The picture changes in 2013 with the services sector showing only negative significance in the bottom 20% of the profitability curve whilst manufacturing shows little inclination to improve productivity, particularly at the lower end of the curve, but there are signs of improving profitability around the median and at the top of the curve.

Figure 5. 5 A 2005 and 2013 Comparison of the Effect of Exporting on Productivity and Profitability



Source: Author

5.9.1 The Manufacturing Sector Sample

In relation to manufacturing, the results for 2005 are either negatively significant or not significant, with evidence that the least profitable firms are experiencing the greatest competitive pressure. To some degree this mirrors the productivity outcome. These results have a number of possible explanations supported by findings in literature. Manufacturing firms benefitted from a significant level of FDI into the NMS; the Czech Republic, Slovak Republic, Poland and Hungary being the primary recipients (Carstensen and Toubal 2004). These firms were participants in the IPNs and therefore intuitively one could justifiably have anticipated a positive result, at least towards the top end of the distribution curve (Guerrieri and Caffarelli 2012). In 2013 the position had improved, with exporting firms showing a positively significant result, albeit, restricted to the 40th, 50th, 60th and 90th percentiles.

Exporting from the NMS is dominated by MNEs with firms being part of IPNs. In this context there are two influences at work. Firstly, in a competitive environment, the network's pressure to reduce input costs, potentially further eroded by currency exchange issues leading to lower value-added imported inputs. This results in a reliance on labour alone to maximise price cost margins, thus depressing profitability.

Secondly is increased competition in an enlarged market place, which further erodes pricing and therefore profitability (Roberts and Tybout 1996). Exporting foreign firms are primarily taking advantage of cheaper skilled labour and have already maximised any productivity advantages, absorbing margin within their imported inputs. Thus, any value added will be confined to labour, and the effect of transfer price protocols and currency exchange volatility creates an opaqueness which makes measurement difficult (Borocz 2012). This results in the Mexican mAcquisladora effect in which foreign inputs are so high that the export multiplier is nullified.

Additionally, there will be indigenous domestic firms exploiting cheap labour as a comparative advantage in industry sectors such as agriculture and apparel, that would gain little productivity advantage, and any revenue gains would be nullified by the competitive pressure on price cost margins and the increased cost of exporting beyond their near abroad. These findings also chime with Bellone et al (2010) finding no intra-European export premia and Greenaway et al (2005) observing no difference in firm performance between exporters and non-exporters in Sweden. There is also evidence

that the NMS are achieving reducing returns from membership of the IPNs, which may also explain the muted effect of foreign ownership in relation to profitability (Kattel 2010).

5.9.2 The Service Sector Sample

In contrast to the manufacturing sector, in 2005 exporters are positively significant across the distribution curve, which indicates that foreign and domestic service exporters have been more successful in increasing profits than their manufacturing counterparts, suggesting a different dynamic at work. The reducing value of the coefficients across the curve suggests that the greatest benefit is experienced by the least profitable firms.

This may be a function of a greater degree of competitive pressure at the top end of the curve, where the more efficient foreign entities are more likely to be found. As a result of the liberalisation of services, the service sector quickly established a vibrant export business. Evidence shows that the NMS benefited from improvements to the institutional environment, the geographical proximity to the EU and the equivalence of time zones, all of which provided advantages over Asian and South American competitors.

A more vibrant export orientated service sector appears to provide downstream benefits to productivity and profitability in the manufacturing sector (see Arnold et al. 2011, Kandilov and Grenne 2010, Fernandes 2009, Eschenbach and Hoekman 2006). However, there does seem to be an issue for firms supplying the domestic market at the lower end achieving improvements in profitability, which may be an erosion of price cost margins as a result of foreign competition.

The manufacturing sector consisted of either older, larger, privatised, domestically owned firms struggling to supply the domestic market in the face of foreign competition, or vertically integrated MNEs providing little opportunity for spillovers. The service sector benefitted from a more open environment in which foreign technology and managerial expertise was more readily available. This led to de novo firms using their comparative advantage to challenge Asian and South American competitors taking advantage of a new market offered by the EU15.

The results, in 2013, for exporting service firms are both puzzling and disappointing, being negatively significant at the 10th and 20th percentiles but otherwise insignificant. This is broadly in line with the 2013 productivity results, but contrasts with 2005 where the results were positively significant for both productivity and profitability across the distribution curve. The result is also contrary to the establishment of successful export businesses taking advantage of geographical proximity, time zone similarities, and improved institutional environments, which have given them an edge against competitors from South East Asia and South America and the NMS firms are now recognised as being amongst the largest services exporters to the EU15 (Kandilov and Grenne 2010).

There are a number of possible explanations, not necessarily contrary to the known facts of export market performance of service sector firms within the NMS.

The first is that, following accession, the initial growth in productivity was a onetime increase, determined by the need to improve profitability to accrue the sunk cost necessary to export. Once achieved, there was no further premium available.

This is evidenced by the findings of Damijan and Kostevc (2006) who found that Slovenian firms, exporting to both the EU and the former Yugoslavian countries, experienced a once only increase in productivity. It is therefore not unreasonable to surmise that this may have had a subsequent effect on profitability. There is evidence that firms exporting to developed countries such as the EU15, have an opportunity of "learning by doing", however, Greenaway and Kneller (2004) found that the more competitive the environment the less effect this would have. The service sector in the NMS was the subject of significant FDI, bringing technology and significant know how, and this allowed convergence with the EU15 and proximity to the technological frontier. Greenaway and Kneller (2004) found that the learning effect dissipated the closer a firm was to the frontier. Bellone et al. (2010) found there was no export premia for intra Europe exporters and, since the majority of NMS exports are to the EU15, these results conform to their findings. In Wagner (2012) review of literature, a number of scholars concluded that there was no evidence of an export premium for service sector exporters. This research finds no evidence of a profitability premium for the manufacturing sector in 2005 although the service sector enjoyed a substantial boost to profitability, particularly at the lower end of the curve. In 2013 the roles are

somewhat reversed, with some evidence of a premium for manufacturers at the top end of the curve whilst any advantage within the service sector had dissipated. This may indicate a degree of convergence with the EU15 (Eschenbach and Hoekman 2006).

5.10 The Effect of Loans on Productivity

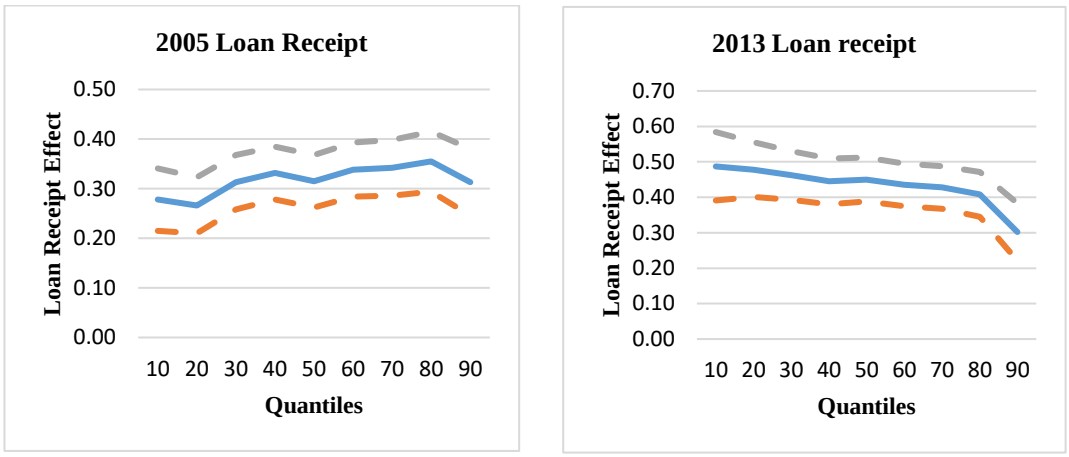
In theory, there are a number of ways in which finance contributes to economic growth, namely the availability of savings, investment information, the management of risk, the existence of a due diligence process and the facilitation of trade in economic commodities and services. Such considerations provide good reason to suggest that finance plays an important role in development. A further contribution to productive performance may be improvements in financial intermediation making access to finance easier (Levine 2005). A review of literature suggests that there is evidence of a strong link between finance and productivity growth.

However, access to finance for small and medium sized firms (SMEs) is seen as problematical with insufficient credit available for all but "bankable" propositions (Stiglitz and Weiss, 1981; Levine 2005; Levine and Warusawitharana 2014).

Reference to Figures 5.5a and 5.5b indicates that in both 2005 and 2013, loans are positively significant (99% C.I) across the distribution curve. In 2005 the results show a slightly rising coefficient value from 0.278 at the 10^{th} percentile to 0.355 at the 80^{th} with a slight fall at the 90^{th}. By contrast, in 2013, the coefficient value is highest at 10^{th} percentile falling away slightly to 0.408 at the 80^{th} with a reduction similar to 2005 at the 90^{th}. This would suggest that, in 2005, the effectiveness of loans increased the more productive the firm, whereas in 2013, there is more traction at the lower end of the curve, possibly resulting from capital deepening at the top end. In both years, the sharp fall at the 90^{th} percentile is possibly a function of the top 10% of productive firms' proximity to the production frontier. Since the effect of loans is universal across all sectors, the discussion does not distinguish between them.

Figure 5. 6 a. and b. The effect of Loan Receipt on the Productivity across the Distribution Curve

5a. **5b.**

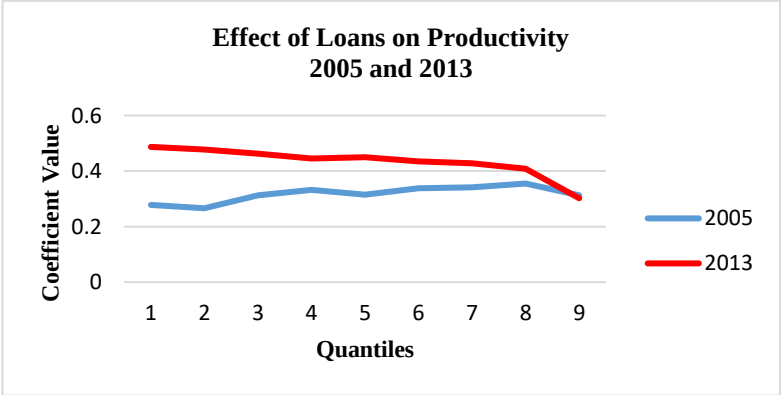


Source: Author

Figure 5.6 below indicates that up to the 80th percentile the effect of loans was greater in 2013, albeit with an increasing level of convergence. The effect is more pronounced at the lower end of the curve. This may be a function of the quality and performance of survivors as FDI and imported product increased competition in an environment in which domestic firms were transitioning from a command to a market economy.

This put pressure on the incumbent firms where only the fittest survived. In 2013 it is the least productive that gain the most, which would suggest that these firms continue to operate some distance from the production frontier.

Figure 5. 7 A Comparison between the Effect of Loans on Productivity across the Distribution Curve in 2005 and 2013

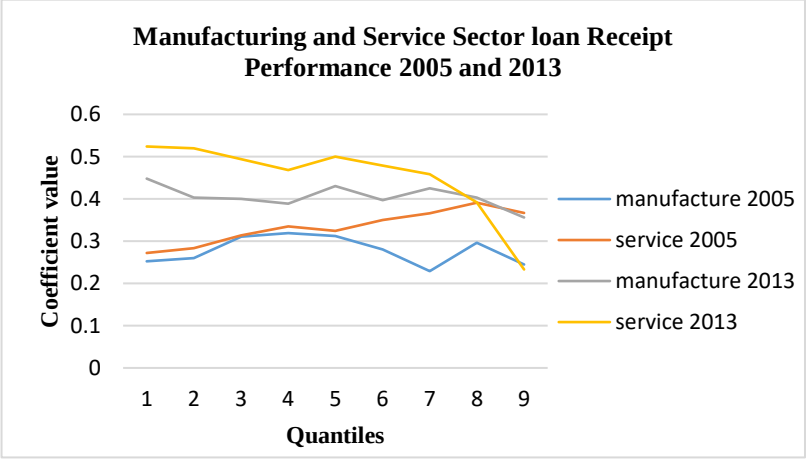


Source: Author

The results show that firms in receipt of loans demonstrate improved productivity, an effect which appears uniform throughout, suggesting a universal benefit across both years and sectors regardless of a firm's position along the curve. The coefficient value in 2005 ranges from 0.266 at the 10th percentile to 0.355 at the 80th which is on a par with any advantage gained by foreign owned firms up to the median percentile. In contrast, in 2013, the coefficient value at the 10th percentile is higher at 0.487 declining to 0.408 at the 80th; the result for the 90th percentile dips sharply in both years. Results for both the manufacturing and service sectors are virtually identical and therefore not reported separately. However, reference to Figure 5.7 below shows that in 2005 the manufacturing and service sector results were virtually identical only to the median and thereafter the gap widened with the most productive service sector firms gaining more traction from loan receipt. This may be the influence of foreign ownership and the burgeoning service sector exporting trade, which boosted productivity on the back of loan receipt. This trend continued in 2013 but with increasing convergence beyond the median, with the influence of loan receipt on service sector productivity falling sharply from the 70th percentile.

There is evidence that the most productive NMS service sector firms were achieving productivity convergence with the EU15 and these results may reflect that.

Figure 5. 8. A Comparison between the Manufacturing and Services Sector in Relation to Loan receipt Effect in 2005 and 2013



Source: Author

Despite clear evidence of the efficacy of loan finance on firm level performance, of note is the number of firms not in receipt of loans and those that found obstacles

accessing finance. Table 5.7 below shows the percentage of the sample in receipt of loans, together with the degree to which firms found obstacles accessing finance, ranging from no obstacle (0) to severe (4).

Table 5. 7 Comparison of Loan Receipts and Obstacles to Finance 2005 V.2013

%	Loan Recipients		Obstacles to Finance	
Firms	2005	2013	2005	2013
total	49.2	36.8	95.5 (44.2)	55.6 (21.4)
large	65.4	55.4	93.2 (38.4)	50.5 (20.5)
SME	44.1	32.7	95.7 (49.9)	56.7 (21.7)

Source: Author ( ) Figures in brackets denote firms claiming severe obstacles

In relation to the full sample, in 2005 49.2% of firms are in receipt of loans. This figure falls to 44.1% amongst SMEs (under 100 employees) and rises to 65.4% for larger firms. A total of 81.4% of the sample are SMEs with 95.7% reporting some obstacle to access finance and 49.9% claiming that the problem is major to severe.

Larger firms claim similar difficulty with 93.2% reporting an obstacle, of which 49.9% claim the problem is major to severe (BEEPS 2005). It is therefore evident that a financial intermediation problem exists in the NMS with (Volz 2010) suggesting that this is due to credit constraints imposed by state owned and foreign banks.

Given the evidence of these results, allied to the evidence in literature of the importance of loans to firm level performance, the significant number of firms not in receipt of loans and claiming obstacles to access to finance is indicative of a lack of financial intermediation and market failure in an area which is a key economic driver. Results indicate that loans enhance productivity therefore, by definition, greater availability will improve productivity and improve the opportunity to close the convergence gap with the EU15 (Levine 2005; Volz 2010; Howard-Jones et al. 2018).

In 2013 the total number of firms in receipt of loans had reduced to 36.8%; to less than a third in relation to SMEs, and to just over a half in the case of larger companies. This indicates that fewer firms are in receipt of loans, although a lower percentage of firms claim an impediment to access to finance. This may be a function of capital deepening, but it could equally be an indication of market failure where firms have abandoned any attempt to access loans given the criteria set by foreign banks with improved credit

scoring criteria which penalised SME's, particularly start-ups and those lacking collateral (Caviglia et al. 2002; Thimann 2002; Volz 2010; Estrin and Uvalic 2016). It could also be the result of a reduction of banking liquidity due to the financial crises, although Gabrisch (2015) claims that it is the level of non-performing loans that lies at the heart of the matter, allied to a policy failure of not confronting the issue. Howard-Jones et al. (2018) suggest that a greater use of leasing in the manufacturing sector may reduce the demand for loans. However, reduction in the number of firms claiming major or severe obstacles to access to finance indicates that, either alternatives were available (leasing), or there was a general recognition that loans were not available from Western Banks due to the increased conditionality of loans. In other words, following the financial crises, pressure on the financial intermediation sector was such that firms recognised the futility of loan application and simply did not apply.

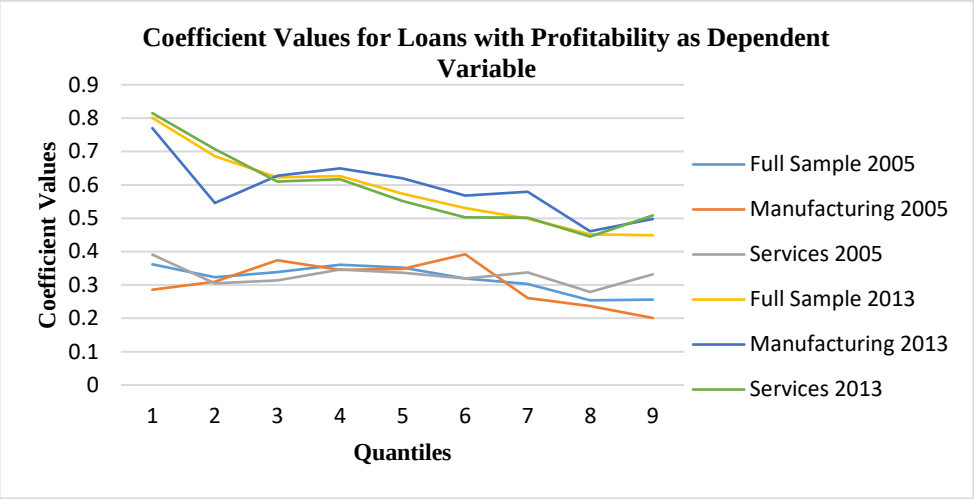
If, as a result of the financial crisis, liquidity was in short supply, this, allied to a reluctance of Western Banks to lend to SME's, may also indicate a degree of market failure. This would not be altogether surprising with a diminution of inward capital flows and Western Banks repatriating capital to shore up their balance sheets at home.

Two further considerations relate to two theories of corporate finance, namely pecking order and trade off. The former postulates that the cost of financing increases with asymmetric information, therefore firms take the view that of the three sources of finance available, they rely firstly on internal funds, secondly on debt and thirdly, equity. In the case of SMEs, it may be a cash flow issue and if sufficient funds are available internally their needs can be met from that source. Larger firms may be in a position to decide on the ratio of debt and equity on the basis of the balance between costs and benefits. The results show that larger firms have a greater level of debt, which may be related to their ability to have higher leverage ratios, which in turn may be related to collateral availability. There is some evidence that SMEs are largely dependent on internal funds due to the difficulties of obtaining external finance. This has policy implications and indicates a need to address market failure to provide a productivity boost to smaller firms which constitute the majority trading in the NMS (Mateev et al. 2013).

5.11 The Effect of Loans on Profitability

The results for profitability in both 2005 and 2013 show that the receipt of loans is positively significant throughout and mirror those for productivity with similarities of performance already discussed in the previous section. Nevertheless, some additional observations are pertinent.

Figure 5. 9 A Comparison between the Effect of Loans on Profitability across the Distribution in 2005 and 2013



Source: Author

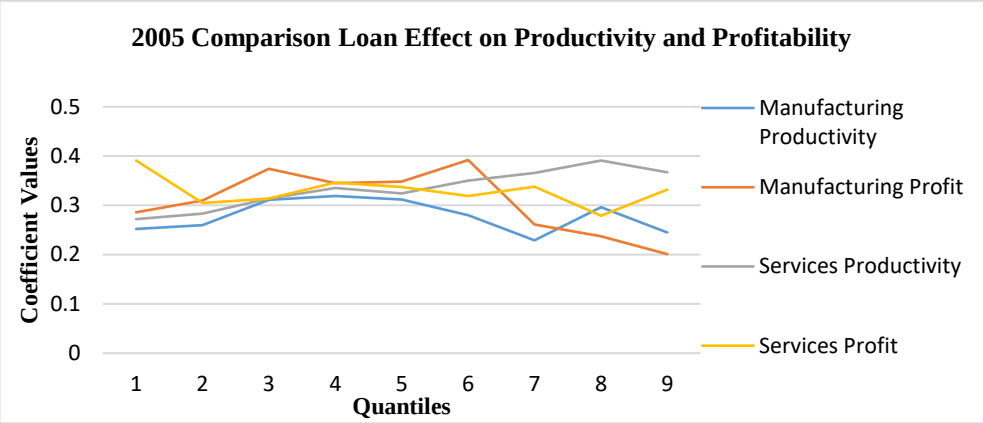
Reference to Figure 5.8 above indicates that profitability improvement profiles have higher coefficient values in 2013 than in 2005, but with a steeper decline in effectiveness from the least to the most profitable firms. In both manufacturing and services, some peaks and troughs are seen at percentile points presumably reflecting sectoral conditions in specific business or industry sectors. However, the influence of loan finance is clear across all sectors in both years. In 2005, at both the bottom and top ends of the distribution curve, service sector firms appear to gain the most traction with manufacturing recovering around the median. In 2013 a similar picture can be observed, albeit that the decline in the manufacturing sector is not repeated at the upper end of the curve. Overall, for those in receipt of loans, the improvement in financial intermediation in the intervening years appears to have improved efficacy (Djalilov and Hölscher 2016).

Figure 5.9 and 5.10 below compare productivity and profitability results for 2005 and 2013. They are shown separately for ease of observation. In 2005 service sector

productivity, particularly beyond the median, exceeds manufacturing, with the same effect being broadly seen for profit. In both sectors, with the exception of the top 20% of firms in manufacturing, profit coefficient values exceed productivity.

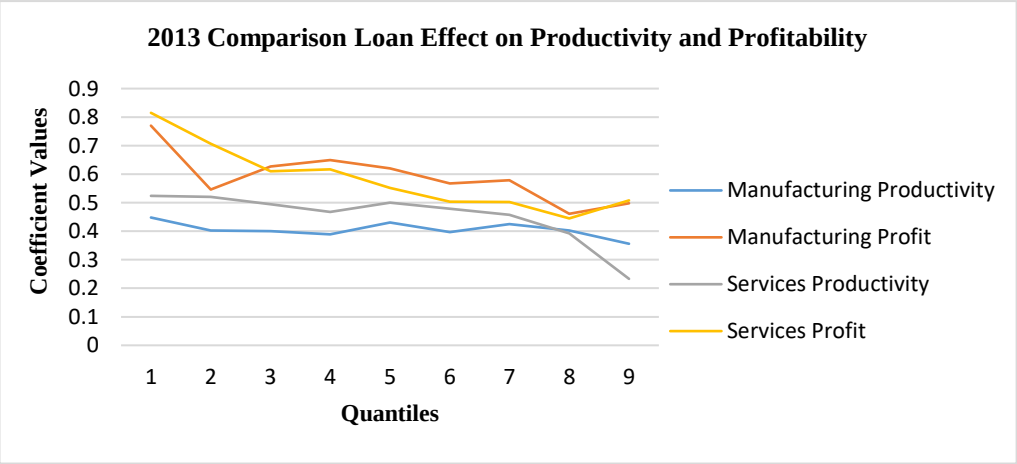
This would suggest that firms below the top 20% in terms of profitability are able to consolidate their productivity gains into an improved profit profile.

Figure 5. 10. A Comparison between the Effect of Loans on Productivity and Profitability across the Distribution Curve in 2005



Source: Author

Figure 5. 11. A Comparison between the Effect of Loans on Productivity and Profitability across the Distribution Curve in 2013



Source: Author

In terms of productivity and profitability the overall efficacy of loans is proven and further enhanced by 2013, although there may be an element of self-selection by the

most productive and profitable firms having met the lending criteria imposed by the predominantly Western Banks.

5.12 The Influence of Control Variables on Productivity

5.12.1 Firm Characteristics

Reference to Table 5.8 below indicates the rather muted influence of firm age and size with negatively significant or not significant results across all sectors in both 2005 and 2013. The result for firm size is similar across both the full and service sector samples, with only manufacturing indicating some traction, particularly at the top end of the curve. This would suggest that older service firms are struggling to maintain competitiveness due to their legacy of inferiority of status in a command economy dominated by the industrial sector. Given the successful establishment of a vibrant service sector, this would indicate that, from a productivity point of view, it is de novo firms that are leading the transformation. The manufacturing sector is dominated by export orientated MNEs with extensive IPNs and, given that it is at the top end where a positive result is seen, it suggests that this is the result of FDI and consequent foreign ownership.

Table 5. 8 Summary of the Results for Productivity with Firm Characteristic as the Independent Variables

		Full sample			Manufacturing sector			Service sector		
Independent variable	**Date**	**q.1**	**q.5**	**q.9**	**q.1**	**q.5**	**q.8**	**q.1**	**q.5**	**q.9**
Age	**2005**	0.158 (0.125)	0.176 (0.112)	-0.301*** (0.027)	0.356 (0.263)	0.882 (2.373)	-0.332*** (0.097)	0.232* (0.139)	0.132 (0.130)	-0.280*** (0.033)
Size	**2005**	-0.136 (0.135)	-0.009 (0.062)	-0.002 (0.020)	0.081* (0.043)	0.031 (0.046)	0.140** (0.067)	-0.565*** (0.106)	-0.094* (0.056)	-0.111*** (0.036)
Age	**2013**	-0.362* (0.202)	-0.203** (0.094)	0.081 (0.116)	-0.176 (0.268)	-0.076 (0.129)	0.075 (0.127)	-0.434** (0.217)	-0.260* (0.141)	-0.134 (0.121)
Size	**2013**	-0.328*** (0.083)	0.126** (0.050)	0.015 (0.030)	-0.330 (0.213)	0.202*** (0.056)	0.083***. (0.041)	-0.319*** (0.089)	0.063 (0.110)	-0.095*** (0.024)

Source: Author

5.12.2 Age of Firm

In 2005, in relation to productivity, evidence suggests that older firms, from the 10th to the 70th percentile gain nothing from EU membership. At the 80th and 90th percentile the results are negatively significant (99% C.I) indicating a negative effect on the most productive older firms. The position deteriorates in 2013 when the results confirm that older, presumably privatised firms continue to experience difficulty within the more competitive environment of the EU, particularly those in the bottom half of the curve with the percentiles beyond being not significant. Across both manufacturing and service sectors the position is broadly similar. Only the top 10% of manufacturing firms show any sign of positive recovery, which would suggest that older firms at the top end of the distribution curve have been able to use their experience and possible erstwhile government contacts, to increase productivity to a point where they are able to take advantage of benefits offered by EU membership. These firms are also more likely to have been privatised and acquired by foreign owners, subsequently benefitting from improved management and technology.

The negative significance at the 80^{th} and 90^{th} percentiles may be the result of an "inertia effect", where the more productive older firms are suffering from a "liability of obsolescence" hampered by the accumulated years in a command economy beset by regressive rules, routines and organisational structures (Coad et al. 2013). These more productive firms are more likely to face the challenge of increased competition, the difficulty of adapting quickly to maintain competitiveness, and the ability to achieve the necessary progression towards a production frontier extended outwards with the arrival of foreign firms. D'Souza et al (2014) find that de novo firms outperform privatised firms: older by definition suggesting that an organic as opposed to an acquired profit motive may be the distinguishing feature.

In contrast to 2005, by 2013 these firms are now experiencing pressure from foreign influences. De novo firms, and those which have retained domestic ownership, are failing to achieve efficiency gains as the NMS become more established within the EU. Surprisingly, within the free market environment, there appears to be a lack of any learning process amongst the older less productive firms, suggesting a deeply entrenched culture that has failed to adapt. They appear also to have failed to achieve the anticipated spillovers from FDI and to have come under pressure from a

diminishing number of state owned firms continuing to enjoy government support, possibly the result of a degree of state capture (Innes 2014).

Many older firms will have been state owned monopolies with access to government, to finance, as and when required, and be accustomed to a supply side form of management where filling productive capacity was a greater priority than satisfying demand. Privatisation, and in many cases dismemberment of these companies, plus the necessity be competitive and establish a profit motive, will have presented a steep learning curve, allied to both a technology and skills gap.

Whilst this does not explain the uniquely negative effect at the higher end of the distribution curve, a possible explanation is that the more productive firms will have developed business models and production techniques based on old technology and outdated working practices and be reluctant to move away from the principle of full employment. Allied to that, they will have been the more successful state monopolies with close ties to bureaucracy. Change will have been difficult, and in that process the introduction of competition, the need to embrace market orientated practices, new technology and a more profit orientated perspective will have impacted productive capacity. The no significance result across the rest of the distribution curve is the result of inertia. Less productive firms have failed to make changes in the context of the domestic market, confirming that the drivers of productivity improvements are de novo and foreign owned firms (Bijsterbosch and Kolasa 2010; D'Souza et al 2016).

5.12.3 Size of Firm

In 2005, in relation to size, results for the full sample indicate no significance across the distribution curve, suggesting that larger firms, however productive and despite economies of scale and network effects, are no more productive than smaller firms. This may imply that larger firms are older and privatised and taking time to adjust to their new environment. In 2013, at the 10th percentile, results for the larger firms are negatively significant, whilst positively significant (90% to 99% C.I) at the 40th, 50th and 60th percentiles, although not significant thereafter. Following Melitz (2003), one might speculate that larger firms at the lower end of the curve are domestically owned, supplying the home market and experiencing competitive pressure from foreign importers, whilst at the top end of the curve, exporting firms have achieved a neutrality

of performance. Those clustering around the median have successfully achieved a modest advantage through economies of scale and network effects and are consolidating their position, possibly with a mix of revenue including some exporting.

Larger firms within the manufacturing sector, particularly at the top and bottom end of the curve, seem to be gaining some advantage from economies of scale, although this is not evident throughout, as the effect is limited to the 10th and 20th percentiles (90% to 95% C.I) and the 70th and 80th (95% C.I). The coefficient values indicate that the most productive firms have achieved the greatest gain with a value of 0.081 at the 10th percentile rising to 0.14 at the 80th. However, the results must be placed contextually. The transitional process has resulted in a reduction in employment following deindustrialisation and a trend away from agriculture. The growth of labour productivity has therefore gone in tandem with declining levels of employment, particularly in the manufacturing sector (Havlik 2004). Despite evidence of productivity growth, there is little sign of convergence with the EU15, which results from the distance of firms from the productivity frontier at the outset, and whilst there is a positive directional trend, a failure to achieve technological parity has blighted further progress.

The results at both the top and bottom ends of the curve may conform to literature as, at the bottom end of the curve, the least productive firms only serve the domestic market but are nevertheless survivors of the competitive pressure that accompanied the accession process. At the top end, the foreign owned exporters have benefitted from the process of Schumpeterian destruction and spillover technology emanating from FDI, and the absorptive capacity to take advantage of their new environment (Bijsterbosch and Kolasa 2009; Melitz and Ottaviano 2008).

The position improves in 2013 with results indicating that firms in the 20th percentile and from the 40th to the 80th are positively significant (95% to 99% C.I); other results not being significant. However, in terms of coefficient value, the larger more productive firms show a diminishing effect, indicating that firms lower down the distribution curve seem to benefit the most, albeit that the result at the 30th percentile in 2013 is not significant. This appears to provide limited support for the fact that larger manufacturing firms are more productive than smaller firms and are able to capitalise on economies of scale and network effects generated by an enlarged market.

However, beyond the 80th percentile, this positive benefit become not significant, which may now be due to the most productive firms being closer to the production frontier.

In the service sector, the results are almost entirely negative or not significant in both 2005 and 2013. Larger firms will almost certainly have been state owned and steeped in the command economies of the NMS. The task of privatisation, reinvention and reorientation to support a market economy would have provided a formidable challenge to even the most productive. Unsurprisingly, results indicate that firms across the distribution curve show a negative effect of membership and the coefficient values show that the least productive suffer the most. This is in contrast to the manufacturing sector result which shows a positive significance at the 10th, 20th, 70th and 80th percentiles. This would indicate that manufacturing firms, despite their inferior productivity performance, are better able to capitalise on competitive pressure and economies of scale. This may be the result of the larger service sector firms entering a more alien environment, than those in the manufacturing sector, with a much steeper learning curve. Equally, at the top end, the more productive firms are coming under pressure from smaller de novo firms and foreign entities.

5.12.3 Summary

These results for age and size are not altogether surprising since firms are likely to have grown and developed in the command economies of Eastern Europe, where the emphasis was on production and not the development of services (Eschenbach and Hoekman 2005). The service industry is relatively new, particularly where it is technology driven. The majority of service firms are therefore likely to be de novo firms with increased flexibility and a greater resilience than the older, larger firms, which provided a limited service within the environment of a command economy. Therefore, experience and economies of scale do not appear to have assisted older, larger service firms to prosper in the new market orientated competitive economy and the hypothesis, based on evidence in literature that they would, must be rejected. Larger, older privatised firms which have not been acquired by foreign owners have clearly struggled with a change of economic environment and failed to establish a platform on which to compete with either foreign imports or companies operating where they had enjoyed monopoly power. The transition from a command to a market

economy has proved, in the short term, too difficult to navigate for more experienced companies with command economy managerial skill and old technology. However, a claim that larger manufacturing firms are more productive has more traction. This result contrasts with the manufacturing sector which, between the 20th and 80th percentiles, showed a positive and significant productivity improvement, possibly the result of FDI. This may suggest that service sector success is being driven by de novo firms and FDI into a more greenfield environment.

5.13 The Influence of Control Variables on Profitability

5.13.1 Firm Characteristics

Reference to figures 5.11a and 5.11b below indicate that in 2005 older service sector firms at the lower end of the distribution curve show some signs of gaining traction, particularly in relation to profitability. However, older more profitable firms, particularly in manufacturing, experience either a negative or no effect from membership. In 2013 the position, particularly in the service sector, deteriorates markedly, albeit that the top 10% of older manufacturing firms show profitability improvements.

The position in relation to size is better. In 2005, the manufacturing sector shows profit improvement at the top end of the curve, whereas the service sector is deteriorating. In 2013, the service sector shrugs off its indifferent productivity performance to record a positive improvement across the distribution curve whilst manufacturing experiences a deteriorating profit position at the bottom although maintaining and improving at the top.

Figure 5. 12a. and 5.12b. A Comparison of the Effect of Age and Size of Firm on Productivity and Profitability in 2005 and 2013

12a

Percentiles	1	2	3	4	5	6	7	8	9
Age 2005 Productivity									
Full Sample									
Manufacturing									
Services									
Age 2005 Profitability									
Full Sample									
Manufacturing									
Services									
Age 2013 Productivity									
Full Sample									
Manufacturing									
Services									
Age 2013 Profitability									
Full Sample									
Manufacturing									
Services									

12b

Percentiles	1	2	3	4	5	6	7	8	9
Size 2005 Productivity									
Full Sample									
Manufacturing									
Services									
Size 2005 Profitability									
Full Sample									
Manufacturing									
Services									
Size 2013 Productivity									
Full Sample									
Manufacturing									
Services									
Size 2013 Profitability									
Full Sample									
Manufacturing									
Services									

Source: Author

5.13.2 Age and Size of Firm - 2005

In 2005 the older, least profitable service sector firms are gaining the most benefit with those at the top end of the curve experiencing either a negative or no effect. Such firms may be more locally based where localism and proximity to local markets is a prerequisite and therefore have nothing to fear from foreign competition; hence their failure to gain any productive traction whilst gaining from the benefits of a more market orientated economy. The older more profitable firms are experiencing a negative effect on profitability, which may be due to pressure from membership caused by competitive forces, or, since their gestation period was in the days of a command economy, they are finding difficulty adapting to their new economic environment. A more plausible explanation however follows Melitz (2003) where the more productive and profitable firms are exporters, subject to increased competition and the subsequent pressure on price cost margins. It is conceivable that at the bottom end of the curve they only supply domestic markets. These firms are the survivors of the impact of imported competition and have benefitted from improved profitability resulting from a liberalised market which has increased demand.

However, with reference to the result for firm size, this suggests that they are the smaller firms with their roots in the command economies of the pre-transition period, experiencing competitive pressure from both foreign entities and domestically owned de novo firms, who themselves are in the development stage one year post accession. D'Souza et al. (2014) found that de novo firms outperformed privatised firms, by definition older larger firms, and claim that this is an organic rather than an acquired profitability effect, which resonates with the results seen here.

The manufacturing sector displays the same characteristics for older firms at the top end with a more negative profile which may have the same explanation. This indicates that with membership of the EU, the most productive and profitable firms decline in performance. The coefficient value for profitability suggests that the negative effect for profitability is greater than that for productivity, which may mean that firms at the high end of the curve come under greater price cost margin pressure than at lower levels, leading to an assumption that this is the result of competition. In relation to size, this would suggest that at the top end of both curves, the impact of FDI is having a beneficial effect with technology, economies of scale and network effects influencing both productivity and profitability. The dichotomy of the age/ size results tend to follow Coad et al. (2005) who found that firm age appears to have a distinctive and negative influence on firm performance. Here, in terms of profitability, it is only the most profitable that benefit, suggesting that outside this cohort competitive pressure has subdued profits, in many cases, despite productivity improvements.

5.13.3 (c) Age and Size of Firm - 2013

In 2013, in relation to older firms, the results may suggest that the older more profitable firms have achieved some traction as they are no longer negative, although any advantage gained at the bottom end of the curve has not been maintained over the intervening years. This result is not altogether surprising since results seen for productivity indicated a negative significance up to the median. This continues the recurring theme of older firms not gaining traction within the new environment created by a market economy within the auspices of the EU.

Conversely size is positively significant from the 60th percentile upwards, with a steeply rising coefficient. This is confirmation of the findings that firm age has a

singular effect on both productivity and profitability as its behaviour differs from size, suggesting that there are nuances to age not present in size, which confirms the necessity to control for both (Beck et al. 2005). There may be a combination of factors ranging from economies of scale, network effects, market power and state capture. Firms may be foreign enterprises and exporters who have maintained control of their supply networks, improved their price cost margins and used their position to consolidate their market presence and exercise corporate power on the political elite (Blagojević and Damijan 2013; Innes 2014; Pavlinek 2015). There is some evidence that age has a distinctive effect on firm performance being positive for productivity but negative for profitability (Coad et al. 2013)

In the manufacturing sector, in contrast to 2005, the top 10% of firms show a positive and significant improvement, whereas, the bottom 20% in the service sector is negatively significant. Results observed from this research indicate that, within manufacturing, there is little influence of age on either productivity or profitability outside the top 10% of firms. The reason may be historical, since older firms in the NMS would almost certainly have been state owned, many with monopolistic market power. On privatisation some would have been broken into separate entities with those surviving possibly becoming foreign owned and amongst the most productive and profitable, although this may be a smaller cohort than one might expect. By contrast, in 2013 larger firms improved productivity, with a lack of significance seen at the bottom and top of the curve, however, in relation to profitability, outside the top 20%, they have failed to improve price cost margins. Whilst the negative results are below the median, following Melitz (2003), it may be that these firms represent non-exporting firms supplying only the domestic market. They could be under competitive pressure from both imports and horizontal FDI, or be smaller firms, at an early stage of development, who are establishing themselves in the market using lower price points (Coad et al. 2013).

In the service sector, any gains made in 2005 by older firms at the bottom end of the distribution curve had dissipated by 2013, suggesting that older firms, probably survivors of the command economy era, are struggling to compete in an environment designed to support a market economy where the least profitable are the biggest losers (Bolton, Roland, et al. 1992). The level of FDI gained by the service sector with

foreign firms seeking to bring their expertise and technology into an environment unaccustomed to a market economy, has crowded out older firms left in domestic ownership. These firms may be smaller and confronted not only by foreign owners, but also by more resilient and flexible de novo firms with a lower cost base and an organic rather than an acquired profit motive (D'Souza et al. 2014).

With the exception of the median, larger firms are positively significant across the curve. This indicates that the most profitable larger firms gain the most from membership as they achieve the benefits of economies of scale and possibly market power. Another striking aspect of the result is the high coefficient values, rising from 0.913 at the 10th percentile to 3.062 at the 90th, indicating that across the profitability distribution curve firms are making substantial gains, with the most profitable making the greatest improvement. This result appears to be a function of the developing demand for services in support of a burgeoning market economy, although the high price cost margins achieved are not the result of productivity improvements since those results were either negatively significant or not significant. This would suggest that service sector profitability is being driven by service liberalisation and the new products required to support other areas of the economy such as manufacturing, infrastructure, retail, utilities and real estate, are creating a highly profitable platform for the sector (Fernandes 2009). This also suggests that there are young de novo firms taking advantage of the opening of the market and the export opportunities offered by expanding into areas such as technology, software and back office services. Of interest in relation to firm size, is the more positive profile displayed by the service sector than by manufacturing, indicating its growing importance within the NMS. This is unsurprising given that services are now providing major inputs into manufacturing, improving competitiveness through education, provision of health infrastructure and the development of human capital and have become significant economic contributors (Eschenbach and Hoekman 2006).

5.13.4 Macroeconomic Variables

In 2005 the macroeconomic variables of GDP growth and inflation have a negative influence on profitability. However, the rising coefficient value across the distribution curve indicates that the more profitable the firm, the more negative the effect. The negative coefficients witnessed may be a factor relating to demand, albeit that the

average GDP growth rate for the NMS was 6.2% in 2005, and the most profitable firms may also be exporters to Europe where growth was lower. Inflation and currency volatility affect price cost margins and, with inflation within the NMS running at an average of 4%, the result will be a negative influence on profitability. Bijsterbosch and Kolasa (2010) claim to have found evidence that there is a negative relationship between FDI and GDP growth in the Central European States attributable to investment in existing privatised entities rather than greenfield sites.

The years following accession resulted in a boom period for the NMS with significant FDI and increasing export and domestic demand, the latter fuelled by consumer debt. The financial crisis brought about a significant reduction in economic activity with average GDP growth in the NMS falling from 6.2% in 2005 to 1.3% in 2013, a fall which would have influenced firm level profitability. The reduction in inflation elicits a positive and significant result across the distribution curve. In 2005 the result was significant and negative with high inflation creating pressure on price cost margins. The lowering of inflation has reduced the pressure on price cost margins, allowing firms to maintain competitive pricing strategies without necessarily eroding profitability.

5.14 Conclusion

In 2005 and 2013 the results for the full sample for both productivity and profitability show that EU membership is positively significant across the distribution curves, with declining coefficient values, indicating that the least productive and profitable firms gain the most traction. In relation to productivity specifically, the coefficient values are greater in 2005, albeit that the spread closes towards the most productive end of the curve.

Profitability results show the same trend for the median and below, although the results are reversed thereafter, with 2013 being marginally higher. In 2005, excepting the 10th percentile, the coefficient values for the productivity results are greater than those for profitability. In 2013 they are reversed.

In 2005 and 2013 the results for EU membership for both the manufacturing and services sectors are similar to those for the full sample and, in overall terms, lead to the same conclusions. However, there are some anomalies in that the 90th percentile for the profitability result in 2005 is not significant. Reference to the outcome for size

of firm and foreign ownership would suggest that firms in the top percentile are large and foreign owned and their proximity to the production frontier may indicate that, either, there is little room for any measurable improvement or, the institutional effect may not be so pronounced. In relation to the services sector, in 2005 the coefficient value is higher than for manufacturing for both productivity and profitability, confirming the sector dummy result seen in the full sample. However, this result is reversed in 2013 with manufacturing profitability having a particularly high coefficient value. This result is not obviously supported by evidence from other variables, which tends to lead to a conclusion that, in the post accession period, the manufacturing sector gained more than services from the development of institutions. This may be unsurprising as the manufacturing sector was targeted by MNEs seeking the comparative advantage of cheap labour and the competitive nature of attracting investment led NMS governments to gear infrastructure and legal and taxation regimes to meet their needs. To some degree, this process was organised by the comprador service, which had a virtual hegemonic role in establishing the relationship between the state and foreign investors (Drahokoupil 2008).

The improvement in performance of the least productive and profitable firms is almost certainly the result of increased competition, generated by a market economy and fuelled by the introduction of FDI and foreign products produced more efficiently and to a better quality. Post accession, evidence of firm exit is difficult to find, however, given the increase in unemployment, it is not unreasonable to suggest that this is partially the reason. Others will have improved efficiency and, by definition, their profitability. Additionally, the exit of the least productive and profitable firms will have raised the bar. The greatest improvement to productivity was seen immediately post accession, in 2005, with the same being true for profits below the median.

However, above the median the most profitable firms show greater gains from profits in 2013, despite the financial and Eurozone crises. This confirms that the more productive and profitable firms have been able to improve price cost margins as result of economies of scale, network effects and market power.

Amongst the most consistent results, beyond those for EU membership, is the influence of FDI which is positive and significant in 2005 and 2013 for both productivity and profitability. This would suggest that FDI is a major driver of

performance improvements at firm level, with the largest acquired firms, allied possibly to de novo companies, being at the vanguard of progress. In 2005, evidence suggests that foreign owned manufacturing firms are more productive and profitable beyond the median, which may indicate a dichotomy between horizontal and vertical investors with the former investing in the domestic market for internal consumption, and the latter as members of IPNs with the objective of exporting. Further research would be required to identify where along the curve these respective cohorts lie.

From a productive point of view, one might speculate that the more capital and transnational input-intensive firms are, at the higher end of the curve, although their profit potential might be impaired by high foreign inputs reducing value added to cheap labour leading to a failure of the export multiplier. Horizontal investors may be able to capitalise on superior technology, management and product quality to drive up price cost margins, which could be an interesting area for further research. In 2013 the manufacturing sector continued to improve productivity, although profit improvement had largely dissipated. It is, however, worth recording that at the 30th, 40th and 80th percentiles coefficient values were positive and very high, with undefined sectoral influences at work. The lack of significance elsewhere is possibly due to the effect of the financial crisis bringing pressure on price cost margins.

Results for domestic manufacturing firms show little significance with 2005 being negatively significant for both productivity and profitability at the bottom end of the curve. In 2013 the position is different when there is some evidence of improvement for both at the bottom end of the curve. However, productivity is negative at the top end, albeit, that at the 80th percentile the coefficient value is very high. These findings are consistent with a lack of evidence of little spillover in the manufacturing sector, possibly as a result of MNEs protecting technology and intellectual property.

FDI made a significant contribution to the service sector results for 2005 and 2013 for both productivity and profitability. Foreign owned firms, outside the least productive and profitable, show gains across the distribution curves, gains which are particularly large in relation to profitability. This may reflect the establishment of a profitable horizontal investment base in the host country and, whilst technology assists cross border trade, presence in the target country is essential when building a successful service business. Investing in local infrastructure markets requires acquisition of state

entities in a privatisation process (Eschenbach and Hoekman 2006). The service sector in the NMS also developed a successful export business taking advantage of stable institutions, geographical proximity, time zones and cultural norms (Kandilov and Grennes 2010). However, it is worth observing that in any one MNS state, the higher the service sector export ration, the lower the export multiplier (Eschenbach and Hoekman 2006). Interestingly, it is in the service sector where the most productive and profitable results for domestic firms are seen, albeit that they are confined to 2005, which may be the result of spillovers. This effect is more apparent in the service sector than in manufacturing and may be as a result of needing to share technology and expertise with local firms in order to guarantee the competitiveness of the trading arrangement, whereas vertically integrated IPNs, with significant transnational inputs, can safely protect their technology and intellectual property (Lesher and Mirodout 2008).

In relation to domestic ownership in 2005 there is evidence in the full sample and service sector that firms make productivity gains from the median upwards but this trend is not repeated in the manufacturing sector which is negatively significant at the lower end of the curve. This suggest that there is no evidence of spillovers in relation to domestic manufacturing firms. The profitability results are not significant in 2005, a result which is repeated across all sectors and performance categories in 2013. Possibly the level of foreign activity within the host countries has been of such a scale as to crowd out domestic firms.

In 2013, there is some evidence that amongst the least productive and profitable firms, segments of those firms have made gains, but identifying the reasons is beyond the scope of this research.

In relation to exports, the full sample results are driven by the service sector in 2005 and the manufacturing sector in 2013. The service sector built an export business capitalising on the trade and geographical environment alluded to above, by reference to the findings of Kandilov and Grenne (2010) and achieved an immediate post accession premium in both productive and profitable performance improvements. This was short lived however with results in 2013 not being significant in relation to both productivity and profitability, excepting a negative result in relation to profitability at the bottom 20% of the distribution curve. This result chimes with a combination of

Bellone et al. (2010) who finds that exporters confined to the EU have a lower productivity than those trading globally, with no apparent exporter premium, and Damijan and Kostevc (2006) who find that firms experience a one off boost to productivity in the year after they start exporting. In 2005 exporters in the manufacturing sector are negatively significant at the bottom of both the productivity and profitability curves, but otherwise not significant, a result which worsens in 2013 for productivity. Evidence of some improvement in profitability around the median and in the top 10% of firms, indicates that the most profitable firms are succeeding in improving price cost margins. Manufacturing exports are dominated by MNEs with vertically integrated IPN business models. Reliant on high levels of transnational inputs, labour alone provides any value added, which, allied to the ability to manipulate cross border pricing structures and management charges, depresses the export multiplier and may explain the results seen in absolute terms. Alternatively, domestic firms in the food and agriculture sectors may struggle to improve production whilst contending with the sunk costs of entering the sophisticated EU market. Overall, the export premia one would expect from the most productive firms do not appear to have materialised.

Firms in receipt of loans achieve gains in both years for both performance measurements. Whilst confirming that access to finance is an essential element of firm level performance improvement, it is evidence of market failure that is the most important message from these results.

Less than half of all firms are in receipt of loans, with significant numbers claiming major to severe problems accessing finance. Potentially this diminishes the ability of the economy to grow at a rate that assists with convergence with the EU15 and requires policy intervention through improved financial intermediation.

In relation to both manufacturing and services, age of firm is largely not significant or negative for both productivity and profitability in both 2005 and 2013, the only exception being the most profitable 10% of older manufacturing firms which gain traction in 2013. The position in relation to size of firm indicates that the largest most productive and profitable firms achieve performance improvement in both 2005 and 2013, indicating that economies of scale, network effects and market power are important drivers of productivity and profitability gains. The services results are more

muted with the exception of profitability in 2013, which shows gains across the distribution curve. This indicates that, whilst productivity is difficult to measure, it is evident the development of a vibrant and successful service sector has brought significant gains across the profitability distribution curve for firms of all sizes.

The larger more profitable firms, probably foreign owned, make more progress than domestic firms, where lack of spillovers and crowding out is evident from the negativity and lack of significance in the results. This may suggest that FDI has not had the effect on national welfare claimed as a result of membership and the liberalisation of markets, including those for the availability of transnational funds. Manufacturing export results are muted and whilst productivity in the service sector is improved, profitability appears to be more elusive, which may reflect the competitiveness of the market compared to Asian and South American firms. The key conclusion to be drawn is that EU membership, conditional on institutional development, allied to FDI and the availability of loans, are the key drivers of firm level performance improvement.

In 2005 the firm level drivers of performance appear have been foreign owned firms with a leavening of the most productive and profitable of those domestically owned. By 2013 this had become more focussed on larger foreign owned profitable firms with some evidence of crowding out of domestic competition. Exporters, prominent in 2005, appear to have made few productivity gains by 2013, albeit that in profitability terms, the most profitable continued to improve price cost margins. In the light of the universal success of membership on firm level performance, it would suggest something other than the effect of firm characteristics and trading, and this lies in the development of institutions to service a market economy and attract FDI. Institutional development was a condition of membership and, as the EU is the embodiment of a controlled and developed sophisticated institutional environment, it is reasonable to hypothesise that this is the element which is the main driver of firm level performance.

Chapter 6 - Firm Performance in the Western Balkan States

6.1 Introduction

The previous chapters have focussed on all eleven new member states (NMS) of the European Union (EU) and compared them to the seventeen transition economies of Eastern Europe and Central Asia. The purpose of this chapter is to evaluate the influence of EU membership and access to finance on the productivity of firms in the Western Balkans. The relevance of this being that all those countries analysed are either EU members or in the accession process, which would suggest that the influence of the EU would be apparent not only within the EU itself, but also within non-EU states. This influence can be evaluated by observing the degree of convergence between the two regions; analysing the productivity performance of EU firms against those within the accession process and identifying whether a strong institutional and regulatory framework is relevant. The other factor of importance is the effect of FDI as the NMS were in receipt of substantial flows of FDI whereas the Western Balkans received significantly less (Estrin and Uvalic 2016). This lack of FDI emphasises the importance of access to finance and, as previous chapters have revealed, findings in literature (see Levine 2005; Volz 2010) confirm the contribution of loans to improved productivity. This chapter, therefore, emphasises the role of loans and the influence of capital on firm level productivity. By disaggregating the full sample, these influences are identified across specific business sectors. The impact of EU membership and loans across the productivity distribution curve are examined and areas of maximum influence across both full and disaggregated samples can be observed.

This study explores, at firm level, the impact of EU membership and access to loans on firm productivity in the Balkan countries of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Serbia, and Slovenia. It compares the levels of output per worker in EU member countries with those outside the EU and uses capital, cost per worker, skill level, foreign ownership, size, age, bureaucracy, and competition as control variables. Bulgaria, Croatia, and Slovenia are already EU member states and Albania, Bosnia and Herzegovina, Kosovo, Macedonia, and Serbia are theoretically part of the pre-accession process.

Significant literature exists on the macroeconomic relationship between the EU and the Balkans (see Bieber 2011; Bechev 2012; Petrovic and Smith 2013; Prokopijević and Tasić 2015). New trade theory states that firms become more productive as a result of increasing economies of scale and network effects (Krugman 1979). The EU is a customs union of 28 counties, which facilitates the development of these attributes and provides a platform to encourage foreign direct investment and exports, the key drivers of improved productivity. In non-EU member countries, there is evidence that lack of access to finance is a constraint on firm-level growth, whereas, with respect to leverage, there is convergence within the EU. Thus, it would appear that, within the EU, as a result of improved financial intermediation, access to finance improves, while outside the EU, credit constraint continues to be a problem. However, correlation should not imply causality. (EBRD 2016).

Until recently, the contribution of finance to economic growth and development was not fully recognised in economic literature, although there is now a strong theoretical foundation for the argument that finance can provide a stimulus to productivity (Levine 2005). This has been increasingly supported by empirical research, some of which specifically relates to transitional countries (Volz 2010). However, there have been few firm-level studies on the impact of EU membership and finance on firm performance in the Balkan region (Shimbov et al. 2016; Botric 2013; Berman and Haricot 2010), and this chapter contributes to this under-researched area. The study focuses on all firms and includes a disaggregated analysis of services and manufacturing. Enhancing productivity is of greater consequence in developing economies than in the developed world as improvement within a national cohort of heterogeneous firms' results in the evolution of a more effective industrial base (Roberts and Tybout 1996).

6.2 Methodology and Variable Selection

6.2.1 Summary

Using two distinct techniques, the Inverse Probability Weighted Regression Adjustment (IPWRA) estimator and quantile treatment effects (QTE) model, this chapter compares the influence of EU membership and receipt of loans on productivity (dependent variable) performance, measured as output per worker, on firms in the

Western Balkans. The former model has been described in 4.2 (equations 1 to 6) of chapter 4 and the latter in 5.2 (equations 7 to 11) of chapter 5.

The IPWRA model utilises a multivalued treatment effect with loans as the additional treatment with the following values:

- Treatment (T) =0 if a firm is not in the EU and has not received a loan (57%);
- Treatment (T) =1 if a firm is in the EU but has not received a loan (53%)
- Treatment (T) =2 if a firm is not in the EU but has received a loan; (43%)
- Treatment (T) =3 if a firm is in the EU and has received a loan (47%)

The IPWRA results are concerned with mean effects and may not reveal the array of influence. The use of QTE regressions allows the analysis to identify where along the distribution curve the effects of EU membership and loans are significant and provides an evaluation of the influence of other key variables. The distribution of the dependent variable may change in ways that are either not revealed or only partially revealed by an examination of the mean (Frolich and Melly 2010). The introduction of quantile treatment effects (QTE) allows the measurement of the effect on the outcome variable (productivity) across the different percentiles of the productivity distribution curve, using median as opposed to the mean. This study applies selection models based on observables, uses a conditional treatment model based on Koenker and Basset (1978), and regresses on two treatment variables, EU membership and loans. The regressions in these analyses are carried out on the full Balkan sample and the disaggregated samples of manufacturing and services. The treatment variables of interest are EU membership and loans measured separately. The control variables have been interpreted to provide a comprehensive picture of the significant influences extant in each quantile. For ease of observation, in all the QTE models below, the first and last two quantiles have been included, since they either reflect the significant results across the productivity distribution, or demonstrate a trend, which either ends or continues before or after the 8th quantile. The estimates shown illustrate the significance of the results in each quantile across each of the distributions. The monetary values have been rescaled (actual number/1000) to provide a coefficient greater than zero where the results are significant.

The conditional model is estimated, thus controlling for firm and market characteristics and, due to the lack of valid instruments in the datasets, it is not possible to estimate

conditional endogenous models. Thus, EU membership and access to loans are regarded as exogenous.

6.2.2 Variable Selection

The list of matching (control variables) and their definitions is presented in chapter 3 Table 3.5 however, for ease of reference, they repeated here as they differ from some of those used in chapters 4 and 5.

Table 6. 1 Variables utilised in IPWRA and QTE

Variable name	Variable description
Treatment variables in the QTE model	
EU member	DV=1 if firm operates in an EU member state; zero otherwise.
Loan receipt	DV=1 if firm received a loan; zero otherwise.
Outcome variable	
Output per worker	Log of output per worker derived by dividing total sales by total full-time equivalent employees
Independent variables	
Capital (net assets)	Net asset value in US dollars.
Capital (replacement)	The cost of replacing current capital stock at 2013 values in US dollars.
Capital (rental)	The cost of renting land property and equipment in US dollars.
Exports	The percentage of exports to total sales.
Skilled workers	The number of skilled production workers employed.
Cost per workers	The total cost of operations per worker in US dollars.
Foreign-owned	Percentage of the firm owned by foreign investors
Firm age	Age of firm derived by subtracting the date of formation from 2013.
Bureaucracy	The addition of a Likert scale score (0 – no obstacle to 4 – very severe obstacle) of perceived problems with customs, tax administration, business licencing, and labour regulations.
Firm size	Categorical variables = 0 if a firm has less than five employees; = 1 if a firm has more than four and less than 20 employees; = 2 if a firm has between 20 and 99 employees; = 4 if a firm has more than 100 employees up to 7 when a firm has more than 1000.
Infrastructure	The addition of a Likert scale score (0 – no obstacle to 4 – very severe obstacle) of perceived problems with electricity, telecommunication and transport.
Competition[1]	DV=1 if a firm reported that the number of its competitors was less than 15; zero otherwise.

1= Balkans chapter only

The outcome variable ‘productivity’ (measured as output per worker) is analysed in relation to EU membership; the rationale for its use as an outcome variable having already been explained in previous chapters, although the concentration on receipt of loans needs justification. There is some evidence that the NMS are beginning to achieve convergence with the original EU 15, albeit that due to economic stagnation within the Eurozone, this is proceeding at a comparatively slow pace (Havlik 2015). Equally, the EBRD 2016 report believes that progress in the Balkans is being retarded

as a result of financial imbalances, credit constraint, and a lack of FDI (see also Estrin and Uvalic 2016). Misallocation of capital may be an additional constraint (Gopinath et al. 2015). This justifies the use of the second treatment variable: access to finance, measured as receipt of loans.

The selection of matching variables is predicated by reference to relevant literature where each has been identified as influencing firm-level performance.[4] To minimise the selection on unobservables, the models include a large number of control variables (see Epifani 2003; Segerstrom and Gustafsson 2006; Bellack et al. 2008; Melitz and Ottaviano 2008; Bridgeman 2010; Covers 2014; Levine and Warusawitharana 2014; Waldkirch 2014; Estrin and Uvalic 2016).

Closing the productivity and technology gap between the transition countries of Eastern Europe and the EU is an important element in the need to achieve economic convergence and European cohesion. The influence of capital accumulation is critical, since it will both improve labour productivity and reduce the technology gap (Filippetti and Peyrache 2013). It is therefore important to control for capital in relation to the measurement of productivity and, since BEEPS allows for the disaggregation of capital into 'balance sheet', 'replacement', and 'rental' (leasing), it enables an analysis of the significance of each on the outcome. This approach is limited to the full sample and manufacturing since the paucity of observations prevents its use in the service sector.

The justification for including 'exports' and 'skilled workers' in the control variables is based on Wagner (2012), who found that exporters were more productive and wage premia were statistically significant, indicating that skilled workers have a positive effect on firm productivity. Evidence suggests that Balkan industry lacks skill due to a mismatch between demand and supply, exacerbated by the educational failings of individual states (Gabrisch et al. 2016, Bartlett 2013).

Employment rates in the Balkan region are problematical, with new EU member states at 64% and non-EU Balkan states at 46%. Evaluating these figures, one might anticipate cost per worker to be suffering some downward pressure. However, a

[4] Where values are monetary, they are measured in different currencies requiring conversion into a common currency. Using 2013 official exchange rates, national currencies were converted into US dollars.

combination of labour market rigidity, incomplete reform programmes, a strong social welfare net, and migration of skilled workers has raised wages in relation to productivity, particularly in non-EU member states (Kovtun et al. 2014). To control for this, the variable 'cost per worker' is included.

Foreign ownership is a reflection of FDI. Evidence exists that it increased in the period before accession to the EU, peaking on the date of accession and declining slightly thereafter. EU member countries have proved a more attractive FDI destination than the Western Balkan states, evidenced by a negative effect in this region. This is possibly a result of the lack of institutional reform and the establishment of strong structural controls (see Krugman 1979; Epifani 2003; Estrin et al. 2009; Gustafsson and Segerstrom 2011; Estrin and Uvalic 2016; Okafor and Webster 2015). To control for this effect, the variable 'foreign ownership' is included.

The Acqui Communautaire (accumulated body of EU law and protocols since 1958) has guaranteed the development of bureaucratic institutions within the NMS, although this process is also evident in Western Balkan countries in accession, where it is more prominent in Serbia, Montenegro, and Macedonia than in Albania, Bosnia and Herzegovina, and Kosovo (Petrovic and Smith 2013). To control for this, the model variable 'bureaucracy' is included, but the inclusion should not imply that this of itself limits productivity.

With respect to firm characteristics, the model also includes firm size and firm age. The inclusion of competition is predicated on the new trade theory and specifically Tybout's (2003) conclusion relating to the effect of foreign firms in relation to local pricing and firm survival. The influence of competition also resonates with international trade, suggesting that larger, more productive firms increase in size and are more efficient. Finally, to account for sectoral heterogeneity, the model includes dummy variables for low tech, mid-tech, and services.

6.3 IPWRA Results

The first stage of the exercise is to use the IPWRA estimator to provide a comparison between EU and non-EU firms and for those with and without loans. The second stage is to use quantile regression to identify where along the productivity distribution curve the effect of EU membership and loans is significant. The evidence can be laid

alongside the influence at each quantile of selected control variables, which further informs the debate by allowing conclusions to be drawn as to the significance of the effects at certain points along the distribution curve. The disaggregated analysis allows an increased microeconomic evaluation of the result.

Treatment effects of any matching estimator based on the propensity score are only estimated in the region of common support. Thus, it is necessary to check the overlap of the propensity scores at different treatment levels. The overlap plots, reported in Appendix 7a to 7c, reveal that the predicted probabilities are not concentrated near 0 or 1, which implies that the overlap assumption is not violated (Cattaneo et al. 2013). Descriptive statistics are included in Appendix 8.

Step 1 of the estimation procedure is the treatment (selection) model, which shows the effects of covariates on the probabilities of different levels of treatment, whereby the base is treatment at level 0. Step 2 is the outcome model, which estimates the impact of covariates on the outcome variable. The coefficients in the models are not of interest in themselves, as the purpose of specifying the model is to facilitate the estimation of treatment effects (Cattaneo et al. 2013). Appendix 7 reports results for the model estimated in the full sample.

Table 6.2 below shows the estimated treatment effects using the IPWRA estimator. For ease of interpretation the results have been transposed into percentage point increases or decreases in productivity and expressed as a percentage in the text. As in chapter four only the percentages are included in the text with the full table in Appendix 8. The analysis covers the full sample of firms in all member states and disaggregated samples of services and manufacturing firms. The results from the full sample have been included for completeness. However, the paucity of observations for capital and skilled workers in the services sector has significantly truncated the observations and thus make the results of limited value. This limitation also applies to the quantile regression modelling. Tables 6.3 to 6.7 below show different levels of observations. This is due to missing data for capital and skilled workers within the BEEPS dataset. Only the absolute results are included, and it is assumed that all observations are at the 99% confidence interval, unless otherwise stated.

Table 6. 2 Absolute effects of EU membership and access to loans: Balkans v. Whole Sample

Outcome variable	Full sample			Manufacturing sector			Service sector		
	1 vs 0	2 vs 0	3 vs 0	1 vs 0	2 vs 0	3 vs 0	1 vs 0	2 vs 0	3 vs 0
Columns	1.	2.	3.	4.	5.	6.	7.	8.	9.
Absolute Effect of EU Membership and Loans in the Western Balkans									
Output per worker (in %)	0.061*** (0.012)	0.039*** (0.011)	0.074*** (0.014)	0.059*** (0.012)	0.036*** (0.120)	0.056*** (0.015)	0.068*** (0.010)	0.043** (0.009)	0.081*** (0.019)
Absolute Effect of EU Membership and Loans in Whole Sample									
Output per worker (in %)	0.048*** (0.006)	0.047*** (0.005)	0.072*** (0.006)	0.034** (0.014)	0.021** (0.011)	0.020 (0.014)	0.042*** (0.007)	0.045*** (0.006)	0.069*** (0.007)

Source: Author

The analysis indicates that firms located within the EU not in receipt of loans are 6.1% (percentage points)[5] more productive than their peer group in non-member states.

The effect of the receipt of loans on EU membership firms is a 1.3% increase in productivity, indicating that loans provide a marginal boost to output. However, in this instance, the joint effect of EU membership and loan receipt is not statistically different from the individual effect of EU membership, as their 95% confidence intervals overlap. Outside the EU the effect on firms in receipt of loans is a 3.9% boost to productivity, indicating the efficaciousness of loans to firms in non-EU states. The lack of statistical difference between EU firms with loans indicates that EU membership rather than loan receipt is the key productivity driver in NMS, and whilst loans may provide a marginal advantage within the EU, they are critical to improving productivity in firms outside. This appears to restrict the influence of loan receipt to firms in non-member states.

These results are in contrast to the results seen in chapter 4 and replicated in Table 6.2, which show a greater advantage to member firms without loans against their non-member peer group, increasing by 2.4% when loans are included. This may suggest

[5] For reasons of brevity, percentage results are shown as a percentage, but should be interpreted as a percentage point increase.

that there is greater convergence between member and non-member firms within the Western Balkans, indicating that entering into the accession process, conditional on a gradual acceptance of the Acqui Communautaire protocols, may have created an improved institutional environment where firms are able to capitalise on market liberalisation, competition and asset protection. However, there are dissenting voices in relation to institutional building with Bieber (2011) and Estrin and Uvalic (2016) claiming that EU state building and institutional development have stalled in the Western Balkans with the latter claiming a negative FDI effect in the Balkans. This may be an interesting aspect of the debate as receipt of loans seems to be more important to non-member firms, which may point to a paucity of other financial resources.

Within the manufacturing sector, EU firms without a loan are 5.9% more productive than their non-EU peer group, indicating no statistically significant difference with the full sample. EU membership, combined with receipt of loans, has a statistically significant impact, albeit, the addition of a loan appears to make no difference to firm level performance. The effect of receiving a loan on productivity in non-EU firms is 3.6%, indicating the greater importance of loans to non-EU firms.

Within the manufacturing sector, EU membership and receipt of loans appears to have greater significance than in the wider study, suggesting that within the Balkans a wider gulf exists between EU member and non-member firms and between non-member firms in receipt of loans in contrast to those without. This may not have much explanatory power since a comparison is being made between the manufacturing powerhouses of central Europe and states that are much smaller economies and comparatively geographically distant from the EU.

In relation to the service sector, the results for EU firms not in receipt of loans are statistically significantly different at 6.8%. This effect increases to 8.1% when a loan is added to EU membership. However, the joint effect of EU membership and loan receipt is not statistically different from the individual effect of EU membership, as their 95% confidence intervals overlap. Non-EU firms receiving loans are 4.3% more productive than non-EU firms without loans (95% C.I), yet this effect is not statistically different from the joint effect of EU membership and loan receipt. Thus, results suggest that, in relation to firms within the EU, it is membership and not loans

that is the key driver of productivity, whilst firms outside the EU benefit with a positive impact on firm productivity. In comparison to the wider study, the membership effect in the Balkans is marginally greater whilst the effect of loans appears to be marginal. Outside EU membership, the effect of loans on non-member Balkan firms is almost identical to the wider study.

Overall the IPWRA results are not sufficiently differentiated from the wider study to draw any firm conclusions that the Balkans are different. The only area of difference may be in the behaviour of the effect of loans where, in the wider study, the impact of loans in the full and service samples within the EU is significant, whereas in the Balkans it appears to have little effect. This may be a result of a greater availability of loan finance as 44.2% of the region is in receipt of loans against 35% in the full study, however within the EU, where the effect appears negligible, loan receipt and access to finance obstacles are identical to the full study, making any meaningful interpretation difficult.

6.4 Results for Quantile Analysis

Table 6.3 below shows the results of the effect of EU membership and the control variables on productivity performance across the distribution curve (10^{th} to 90^{th} percentile). The results are for the full sample and are further disaggregated to measure the effects on the manufacturing and service sector. In the full sample, EU membership is positive and highly statistically significant in the 10^{th} to the 60^{th} percentile, with the coefficients decreasing in magnitude over the productivity distribution curve. This would suggest that firms at the lower end of labour productivity distribution enjoy the greatest benefit from membership, with no significant results being seen at the upper end of the scale. A graphical illustration is included at appendix 9. This is a different result from that seen in the wider sample where the advantages of EU membership, whilst diminishing from a high amongst the least productive, is positive and significant across the curve. This indicates that among the EU Balkan states the advantages of membership appear confined to the median and below, with little advantage being gained by the 40% most productive firms, whereas in the wider sample the effect is more universal. This may be indicative of a degree of convergence between the most productive member and non-member firms. The EU "launched the Stabilization and Association Process specifically for the WB

countries offering trade liberalization measures, a new financial assistance programme, contractual relations through the signing of Stabilization and Association Agreements, and even prospects of EU membership" (Estrin and Uvalic 2013; pp 14). Thus, it is not unreasonable to suggest that, at least amongst the most productive firms, an environment was created which has allowed non-member firms to achieve a productivity profile commensurate with companies in membership.

The importance of capital is also seen as significant, with 'rental capital' (95% to 99% C.I) being influential across the 10^{th} to the 40^{th} percentile. This may suggest that below the median point of the distribution, equity, as a means of capitalisation, is in short supply (Estrin and Uvalic 2016). It is reasonable to assume that the term rental capital is a description of leasing and may be providing a substitute for loans.

The percentage of firms in receipt of loans is low but the availability of a leasing market allows, particularly the manufacturing sector, to provide collateral to enable the funding of new technology required to maintain competitiveness. However, the negative coefficient 'replacement value of capital' is reported in the 50^{th} and 80^{th} percentiles, which may also indicate that firms are struggling to modernise in parts of the distribution curve, and this may well be due to a problem with access to finance.

The negative coefficient on 'age' (95% C.I) in the 90^{th} decile may suggest that older firms are less productive than more modern enterprises, indicating that they may be privatised firms at the top end of the distribution curve experiencing issues with dated equipment and/or practices. Firm size is positive at the 20^{th} and 90^{th} percentiles, suggesting that the larger most productive firms conform to literature by taking advantage of economies of scale and network effects. However, the results are similar to those seen in the wider sample and the lack of significance seen across the distribution curve suggest that older, larger privatised firms, which have not been acquired by foreign buyers, are struggling to gain traction in the new environment. The positive significance of 'bureaucracy' in the 10th and 90th percentiles indicates that at the lower and top end of the distribution curve, there is an awareness of the impact of institutional development, and when combined with the results for size and age, may suggest that this may be restricted to the older, larger firms.

The negative coefficient on skilled workers across the productivity distribution curve (90% to 99% C.I) is possibly a reflection of a skills mismatch, allied to a failure of

appropriate levels of educational training and the impact of migration reducing absorptive capacity (Gabrisch 2016; Gabrisch et al. 2016). An OECD working paper concludes that "the main results suggest that higher skill and qualification mismatch is associated with lower labour productivity, with over-skilling and under qualification accounting for most of these impacts" (McGowan and Andrews 2015, pp.32). However, the positive coefficient of cost per worker, again across the curve, may be a reflection of the comparative advantage of cheaper labour.

In relation to the manufacturing sector, the 10th and 20th percentiles of the distribution finds EU membership to have a positive and highly significant effect, although significance levels and the magnitude of the coefficients decline above the 20th percentile, with the evidence suggesting support for the influence of EU membership up to the 70th percentile. This result is in contrast to the full sample where a diminishing influence is seen across the distribution curve. This would suggest that the most productive manufacturing firms within the Balkan region are gaining little from EU membership. This may support Estrin and Uvalic's (2016) claim that FDI is in short supply with a negative perspective and, since it is the more productive larger, older firms that would have been attractive to potential foreign buyers, a paucity of foreign capital may have had a deleterious effect on productivity. This effect may be exacerbated by the dominance of Western capital in the Balkan Western banking system, bringing with it enhanced credit scoring and collateral requirement creating market failure in the loan market. The lack of significance at the top end of the curve is to some degree supported by the negative significance of age at the 90th percentile (95% C.I), albeit that size is positively significant, suggesting that older more productive firms have a greater degree of difficulty in adjusting to a market economy, whereas, their larger counterparts are able to take advantage of economies of scale and network effects thus gaining traction.

'Balance sheet capital' has a positive and significant effect in the 10th, 70th and 80th percentiles (90% to 95% C.I) which may indicate that some capital is available in the manufacturing sector at some points, particularly the upper end of the distribution curve. 'Rental capital' (leasing) is positively significant (95% C.I) across the first half of the distribution curve, suggesting that leasing is an important source of finance up to the median. Since this money is being used to invest in assets, the availability of

collateral may make this an effective form of finance for the poorer performing firms satisfying the risk profiles of the Western controlled banks. The negative coefficients on replacement capital in the 30th and 80th percentiles indicate that replacing ageing assets may be problematical and point to a difficulty raising capital within the manufacturing sector, particularly amongst the least productive firms. Capital has not been measured in the wider sample due to the unacceptable reduction in sample size resulting from missing values and, whilst it would be disingenuous to attempt to draw too wide a conclusion given the difficulty the Balkans has had in attracting capital, there are some observations that may be valid. The positive significance of rental capital may explain why, in the wider sample, firms in the lower half of the distribution show such a high coefficient. They may well be replacing loans, which are unavailable, with leasing capital. The intermittently negative influence of replacement capital may indicate that, across the distribution curve, some firms are struggling to adopt new technology due to unavailability of finance.

The negative effect of skilled workers across the distribution curve (90% to 95% C.I), allied to the positive effect of cost per worker, indicates that there is a positive comparative advantage in the availability of cheap labour. However, skills are missing, which will impact absorptive capacity. This may be due to migration, but could equally be the result of an inadequate educational system to replace the old established Soviet system geared to manufacturing and full employment. In the upper and lower percentiles, the positive effect of 'bureaucracy' (99% to 95%) indicates the importance of institutional development, albeit, that this is a weak indication of effectiveness given the absence of significance across the rest of the distribution curve.

In relation to the services sector, all capital- and skill-based variables have been removed from the model due to a paucity of observations. In contrast to the full sample, the services sector indicates that the impact of EU membership is positive and highly statistically significant for the 10th to the 80th percentiles, with no significance only amongst the most productive firms. This result is more in keeping with the wider sample and suggests that the services sector as a whole has received a significant boost from EU membership. As in the full sample, a declining magnitude is found for the coefficient on EU membership variable, suggesting that the least productive firms enjoy the most benefit, the result concurring with that for the wider sample.

For the first time foreign ownership has a positive and statistically significant (95% to 99% C.I) effect throughout the distribution, indicating the relevance of FDI in tandem with EU membership and suggesting that, within the Balkans, the bulk of FDI has gone into the service sector and a combination of this, with EU membership, has benefitted the whole sector. The result is different from the wider sample where both manufacturing and services are beneficiaries of FDI and, whilst the Balkans are some distance away from the power house manufacturers of central Eastern Europe, this does emphasise the need to provide a more attractive environment for manufacturing FDI.

A further point of difference with the rest of the Balkans and wider sample is the universal positive significance of age and size (90% to 99% C.I), suggesting that larger, older firms are attractive to foreign investors particularly when paired with the positive significance of cost per worker (95% to 99% C.I) and may suggest horizontal investment opportunities. Outside the least productive 20% of firms, the negative and highly statistically significant influence of competition in the upper deciles of the distribution indicates that, in this sector, the competitive environment of the expanded EU is creating pressure for the most productive firms in the NMS. In contrast to both the full sample and the manufacturing sector, the results suggest that the service sector has become more engaged with the EU, taking advantage of the wider market, attracting FDI and, whilst struggling to remain competitive, providing positive results, even for older, larger firms.

Table 6. 3 Results from the QTE model with EU membership as the treatment and output per worker as the outcome variable

	Full sample				Manufacturing sector				Service sector			
Independent variable	**q.1**	**q.2**	**q.8**	**q.9**	**q.1**	**q.2**	**q.8**	**q.9**	**q.1**	**q.2**	**q.8**	**q.9**
EU membership	0.477***	0.352***	0.080	0.024	0.575***	0.321***	0.130	0.117	0.839***	0.647***	0.178**	0.011
	(0.132)	(0.109)	(0.081)	(0.093)	(0.135)	(0.124)	(0.081)	(0.090)	(0.118)	(0.101)	(0.085)	(0.093)
Capital (assets)	0.002	0.002	0.001*	0.002*	0.0020**	0.002	0.001*	0.002				
	(0.001)	(0.001)	(0.001)	(0.001)	(0.127)	(0.124)	(0.081)	(0.092)				
Capital (replacement)	0.000	-0.000	-0.000*	-0.000	0.000	-0.000	-0.000***	0.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
Capital (rental)	0.070***	0.062***	-0.002	0.020	0.073***	0.061***	0.006	0.016				
	(0.021)	(0.018)	(0.014)	(0.047)	(0.0250)	(0.018)	(0.015)	(0.038)				
Exports	0.493*	0.183	0.131	-0.068	0.206	0.192	0.051	-0.022	0.401	-0.121	0.367	0.390
	(0.255)	(0.282)	(0.306)	(0.358)	(0.314)	(0.303)	(0.265)	(0.353)	(0.407)	(0.392)	(0.388)	(0.369)
Skilled workers	–0.348*	–0.511**	–0.519***	–0.780***	–0.500**	–0.479**	–0.364**	–0.711***				
	(0.211)	(0.202)	(0.189)	(0.217)	(0.244)	(0.216)	(0.176)	(0.215)				
Cost per worker	0.013***	0.015***	0.014***	0.010***	0.012***	0.016***	0.016***	0.011***	0.015***	0.016***	0.022***	0.024***
	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)	(0.004)	(0.002)	(0.002)	(0.002)	(0.005)	(0.006)	(0.005)
Foreign-owned	-0.001	0.001	0.002	0.001	-0.001	0.003	0.001	0.001	0.004	0.008***	0.004**	0.007**
	(0.003)	(0.004)	(0.002)	(0.002)	(0.005)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
Firm age	–0.004	–0.005	–0.001	–0.006**	–0.011*	–0.004	–0.002	–0.007***	0.015***	0.015***	0.010**	0.009
	(0.004)	(0.004)	(0.002)	(0.002)	(0.006)	(0.004)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)	(0.006)
Bureaucracy	0.213**	0.105	0.082	0.172*	0.213**	0.091	0.158*	0.246**	0.158	0.143*	0.126*	0.089
	(0.092)	(0.084)	(0.077)	(0.097)	(0.104)	(0.088)	(0.084)	(0.102)	(0.102)	(0.080)	(0.069)	(0.079)
Firm size	0.115	0.146*	0.081	0.125*	0.212**	0.125	0.099*	0.150**	0.333***	0.291***	0.118**	0.099*
	(0.092)	(0.083)	(0.060)	(0.069)	(0.094)	(0.090)	(0.059)	(0.066)	(0.088)	(0.069)	(0.052)	(0.059)
Competition	–0.037	0.014	–0.098	–0.099	–0.136	0.021	-0.095	–0.116	–0.047	–0.139	–0.233***	–0.259***
	(0.128)	(0.111)	(0.084)	(0.091)	(0.131)	(0.116)	(0.086)	(0.094)	(0.118)	(0.097)	(0.081)	(0.091)
Low-tech	–0.339**	–0.407***	–0.283**	–0.219*	–0.176	–0.361**	–0.378***	–0.260**				
	(0.150)	(0.137)	(0.110)	(0.129)	(0.181)	(0.165)	(0.116)	(0.130)				
Mid-tech	–0.291	–0.287*	–0.216*	–0.265**	–0.184	–0.250	–0.248**	–0.287**				
	(0.180)	(0.153)	(0.111)	(0.128)	(0.208)	(0.167)	(0.119)	(0.123)				
Services	–0.286	–0.471	0.374	0.883*	1.025	0.680	–0.257	–0.527**				
	(0.369)	(0.320)	(0.370)	(0.523)	(0.974)	(0.703)	(0.690)	(0.218)				
Constant	9.022***	9.603***	10.894***	11.477***	9.027***	9.581***	10.642***	11.296***	7.920***	8.673***	11.033***	11.562***
	(0.260)	(0.244)	(0.183)	(0.207)	(0.297)	(0.270)	(0.190)	(0.240)	(0.155)	(0.132)	(0.141)	(0.174)
No of obs.	550	550	550	550	450	450	450	450	1,370	1,370	1,370	1,370

6.5 The Quantile Estimator Results with Loans as the Treatment variable

Table 6.4 below shows the results when loan receipt is the treatment variable. It is important to emphasise here that these results are for all Western Balkan states and that there is no distinguishing factor between member and non-member states. In the full sample, loans are only significant in the first two percentiles (95% to 99% C.I), suggesting that efficacy is confined to the least productive firms and therefore the advantages of loan receipt are restricted to the bottom 20% of the productivity distribution curve. A graphical illustration is shown at appendix 10. This result contrasts with those of the wider study where receipt of loans has a universally efficacious effect. This suggests that only the least productive, some distance from the production frontier, achieved any traction from receipt of loans, the balance showing no improvement. The Western Balkans were significantly affected by the Eurozone crisis and the results may be a reflection of a loss of Western European funds flow leading to a financial intermediation crisis and, in the absence of any bailout from the EU, there was little money to lend or any demand for it (Bartlett and Prica 2013). Rental capital has a positive and significant effect from the 10^{th} to the 40^{th} percentile, confirming the necessity for borrowed capital below the median of the productivity distribution curve. Balance sheet capital is positively significant (90% C.I) at the 90^{th} percentile and replacement capital negatively so at the 40^{th} and 70^{th}, indicating that the most productive firms are adequately capitalised, whilst generally across the distribution curve, there are difficulties in replacing assets to improve productivity. The position in relation to capital may not be confined to the Western Balkans, albeit that their recent violent history makes potential investors regard the region as being higher risk.

The negative coefficient results across the distribution curve in relation to skilled workers (95% to 99% C.I) and contrasting positive coefficient of cost per worker are features of results throughout the quantile regression models; possible explanations have been given earlier in this study. The results for age and size are largely insignificant, but negative significance for age (95% C.I) at the 90th percentile and, in contrast, positive at the 10^{th}, 20^{th} and $90^{th,}$ indicates that older more productive firms may struggle in an environment of increased competition, whereas larger firms at both the lower and upper ends of the curve benefit from economies of scale and network

effects. The results for skills and employee costs are interesting in that they relate to both member and non-member firms, which may reflect the efficacy of the accession process or the universal nature, throughout the transitional economies, of the comparative advantage of cheap labour allied to an absence of skills, indicating a potential lack of absorptive capacity to make the technological changes required to become competitive. The positive significance of bureaucracy (95% C.I) at the 10th percentile and the negativity of competition (90% C.I) at the 80th may indicate some comfort being gained form institutional development at the bottom end of the curve, whilst at the top, the increased competitiveness of a liberalised market is creating problems for older more productive firms.

Within the manufacturing sector, loans are positively significant (95% C.I) in the 10th and 20th percentiles, suggesting that, within the sector, the least productive firms appear to be the only ones benefitting from loan receipts. Rental capital is positively significant (90% to 99% C.I) up to the median, indicating the availability of leasing, with the purchase of assets providing a level of built in collateral. It is, therefore, reasonable to suggest that this should be evaluated in tandem with loan receipt. However, the efficacy of both loans and leasing is restricted to the least productive firms questioning the availability of finance to the more productive above the median. The positive and significant result for balance sheet capital at the 80th percentile (90% C.I) provides some evidence that the more productive firms may be better capitalised. The negatively significant result for replacement capital at the 30th and 40th percentiles may reinforce the view that it is firms at the lower end of the distribution curve that experience difficulties in replacing assets, with those above the median being sufficiently well capitalised to make the required purchases, but the evidence is tenuous at best. In relation to loans, these results are markedly different from the larger sample where the efficacy of loan receipt is universal across countries and sectors and, on the assumption that Estrin and Uvalic's (2016) claim that the Balkans are different, the results may suggest that beyond the least productive firms, loans actually have no material effect on productivity. In turn this may suggest that the purpose of loans in the most productive firms was not productivity centric.

Negative effects of skilled workers and positive effects of labour costs feature significantly throughout the distribution and give credence to the possible explanations given earlier in this paper. Size is positive and highly statistically significant in the 10^{th} percentile, age is negatively significant in the 90^{th} percentile with foreign ownership positively significant in the 30^{th} percentile. This suggests that larger firms, possibly privatised, see the opportunities of economies of scale but struggle to achieve productivity improvement. They may be foreign owned and, allied to the negative perspective of replacement capital, reflect foreign owners confronted with the scale of modernisation required. The negative impact of firm age in the 90^{th} percentile may indicate that older firms have difficulty with ageing assets and the required cultural changes. The contrast here is the lack of significance across the majority of percentiles of the foreign ownership distribution curve, which is in marked contrast to that seen in the wider sample. Again, one relies on Estrin and Uvalic (2016) to claim that the Western Balkans are different and, post the financial crisis, particularly in the manufacturing sector, have seen a paucity of FDI. This may suggest, not only a negative attitude to investment into the Balkan manufacturing sector, but also the relative geographical distance from the near EU Western states making their inclusion in international production networks less appealing.

Table 6. 4 Results from the QTE model with loan receipt as the treatment variable and output per worker as the outcome variable

Independent variable	Full sample				Manufacturing sector				Service sector			
	q.1	q.2	q.8	q.9	q.1	q.2	q.8	q.9	q.1	q.2	q.8	q.9
Loan	0.463***	0.232**	0.100	-0.016	0.410**	0.241**	0.054	0.063	0.284**	0.319***	0.080	0.074
	(0.137)	(0.105)	(0.084)	(0.092)	(0.159)	(0.115)	(0.086)	(0.096)	(0.141)	(0.102)	(0.083)	(0.088)
Capital (assets)	0.001	0.001	0.001	0.002**	0.002	0.002	0.002	0.002				
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)				
Capital (replacement)	0.000	–0.000	–0.000	–0.000	0.000	–0.000	0.000	0.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
Capital (rental)	0.076***	0.068***	-0.002	0.019	0.079***	0.059***	0.011	0.010				
	(0.011)	(0.027)	(0.016)	(0.044)	(0.024)	(0.000)	(0.019)	(0.002)				
Exports	0.418	0.088	0.191	–0.045	0.205	0.098	0.225	0.037	0.285	-0.164	0.220	0.425
	(0.295)	(0.278)	(0.305)	(0.336)	(0.339)	(0.284)	(0.274)	(0.278)	(0.406)	(0.441)	(0.390)	(0.383)
Skilled workers	–0.602***	–0.567***	–0.407**	–0.803***	–0.632***	–0.272	–0.434**	–0.717***				
	(0.212)	(0.207)	(0.186)	(0.219)	(0.237)	(0.225)	(0.179)	(0.217)				
Labour cost	0.014***	0.019***	0.013***	0.010***	0.014***	0.019***	0.015***	0.011***	0.016***	0.019***	0.027***	0.024***
	(0.002)	(0.003)	(0.002)	(0.001)	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)	(0.006)	(0.006)	(0.005)
Foreign -owned	–0.001	–0.004	0.003	0.001	–0.001	0.001	0.002	0.001	0.004	0.009***	0.004**	0.008**
	(0.003)	(0.005)	(0.003)	(0.002)	(0.006)	(0.004)	(0.002)	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)
Firm age	–0.007*	–0.002	–0.002	–0.006**	–0.009	–0.001	–0.001	–0.005**	0.013**	0.015***	0.011**	0.005
	(0.004)	(0.004)	(0.002)	(0.002)	(0.006)	(0.003)	(0.002)	(0.002)	(0.006)	(0.005)	(0.005)	(0.006)
Bureaucracy	0.175**	0.078	0.080	0.157*	0.115	0.044	0.141	0.210*	0.083	0.109	0.131*	0.104
	(0.085)	(0.077)	(0.080)	(0.094)	(0.090)	(0.076)	(0.087)	(0.108)	(0.137)	(0.089)	(0.070)	(0.079)
Firm size	0.200**	0.181**	0.046	0.120*	0.245***	0.091	0.052	0.100	0.396***	0.291***	0.121**	0.106*
	(0.087)	(0.075)	(0.060)	(0.063)	(0.088)	(0.079)	(0.059)	(0.069)	(0.105)	(0.073)	(0.055)	(0.061)
Competition	–0.019	0.002	–0.143*	–0.096	–0.033	–0.063	–0.097	–0.166*	–0.113	–0.156	–0.284***	–0.295***
	(0.116)	(0.103)	(0.086)	(0.091)	(0.129)	(0.109)	(0.086)	(0.097)	(0.131)	(0.102)	(0.081)	(0.089)
Low-tech	–0.376**	–0.352**	–0.335***	–0.221*	–0.293*	–0.169	–0.382***	–0.269*				
	(0.151)	(0.143)	(0.112)	(0.118)	(0.162)	(0.161)	(0.115)	(0.142)				
Mid-tech	–0.245	–0.107	–0.215*	–0.261**	–0.231	0.004	–0.286**	–0.315**				
	(0.179)	(0.148)	(0.117)	(0.116)	(0.198)	(0.162)	(0.116)	(0.129)				
Services	–0.167	–0.263	0.393	0.837*	1.210	0.786***	–0.378	–0.490				
	(0.278)	(0.254)	(0.406)	(0.501)	(0.957)	(0.252)	(0.753)	(0.876)				
Constant	9.018***	9.367***	10.908***	11.519***	9.038***	9.265***	10.773***	11.433***	8.022***	8.745***	11.045***	11.570***
	(0.251)	(0.232)	(0.179)	(0.200)	(0.258)	(0.257)	(0.185)	(0.231)	(0.171)	(0.142)	(0.145)	(0.169)
No of obs.	550	550	550	550	450	450	450	450	1,370	1,370	1,370	1,370

Source : Author

In relation to the service sector, capital and skill set variables have been omitted due to paucity of observations. Receipt of loans is positively significant from the 10th to the 60th percentile, which suggests that loans appear to have greater influence just beyond the 60% median, but that more productive firms have limited benefit. With the exception of the 10th percentile, foreign ownership is positively significant throughout the distribution (95% to 99% C.I). Age, with the exception of the 90th percentile, which is insignificant, is now seen as a positive attribute (95% to 99% C.I) across the distribution curve. Allied to firm size, which is universally significant (90% to 99% C.I), suggests that older, larger service firms are not only a target for FDI, but also an important contributor to the Balkan economy and an important influence on firm productivity.

The negative coefficient on 'competition' appears significant across the distribution from the 3rd to the 9th decile ($p<0.01$ to $p<0.1$), increasing in magnitude at higher levels of the distribution curve. This indicates that the higher up the productivity curve, the greater the pressure from competition, affirming that larger, older firms are feeling the greatest competitive pressure. Loans appear to be more important below the median, which is the case even under foreign ownership. This may be the result of the provision of loans by transnational companies, or the availability of collateral to lenders who are themselves foreign-owned banks. However, these findings support and emphasise the importance of FDI in the sector, together with the availability of loans at the lower end of the spectrum. The importance of firm age and size in the service sector suggests that older, larger, and more experienced firms are attractive to FDI and this may create increasing competitiveness within the enlarged EU, encouraged by the presence of foreign ownership. The ever-present positive significance of cost per worker indicates that the service sector is comfortable with its cost per worker ratios.

The full tables for the quantile estimators are attached at appendices 11 and 12.

6.6 Conclusion

The IPWRA results indicate that EU membership contributes to improved productivity across the full, manufacturing and service sector samples, confirming the findings of previous chapters. This would suggest that an improved institutional environment, allied to unfettered access to the customs union, may be major contributors to these results. The

results indicate that, in the Western Balkans, the influence of membership provides a marginally greater productivity advantage over non-member firms in comparison to the whole sample. However, on the other hand, loans, show only a marginal additional effect with any benefits accruing only to the service sector. The influence of loans, whilst consistently positive in the non-member states, has little effect when added to membership. This is particularly true in relation to the manufacturing sector. The Western Balkans are dominated by foreign banks and the introduction of the requirement for collateral and improved credit scoring may, as in the whole sample, have created an environment leading to market failure. The service sector has a marginal productivity advantage over the manufacturing sector but overall these results are unremarkable in relation to that seen in the whole sample and little additional evidence is seen. In fact, given the fact that all firms in the Balkan sample are either in EU membership or in the accession process one might have expected to see signs of a degree of convergence but there is no evidence that this has transpired. This may be the result of the later development of the accession process due to armed conflict in the non-member states, thus accentuating the differential with firms in membership.

The QTE model shows that, in the full sample, the significance of EU membership is confined to the 10^{th} to the 60^{th} percentile with the median recording no significance. The manufacturing sector extends significance to the 70^{th} percentile, albeit with no significance in the 40^{th}, whilst the service sector results are positive and significant to the 80^{th}. All the results show, as in the whole sample, a diminishing significance as firms become more productive, indicating that the least productive firms make the most gains. However, there are two important distinctions when comparing the Balkans sample with the whole sample, firstly in the full and sector samples there is no evidence of improvement at the top of the distribution curve with 10% to 30% of firms showing no growth in productivity. Secondly, coefficient values are much lower in the full and manufacturing samples than in the whole sample equivalent, with only the service sector showing higher values up to the median before falling back to being broadly similar.

The superior performance of the service sector may be a reflection of the influence of FDI which is the only sector to show a significant benefit of membership in foreign owned firms. The service sector benefits from FDI from the 20^{th} to the 90^{th} percentile and, when combined with the significance of membership to the 80^{th} percentile, this seems to

confirm the proposition that foreign ownership enhances the benefits of membership amongst all but the least productive firms. The lack of significance in the manufacturing sector in relation to foreign ownership may provide some evidence that, whereas the least productive domestic firms, some distance from the production frontier, will have been forced to improve their competitiveness or exit the market, the most productive will have anticipated the intervention of FDI. Its absence may have resulted in a failure amongst the most productive firms to achieve technological breakthroughs, which would have provided a platform for further improvement. It may also reflect the low-tech nature of the Balkan region manufacturing sector proving of no interest to foreign investors (Gabrisch et al. 2016).

There is no evidence of any benefits accruing to exports in either the manufacturing or service sector which may be a reflection of distance to market within the EU and therefore the lack of any MNE interest in forming IPNs in the region. Throughout the quantile analyses, negative skill levels and positive cost per worker feature throughout the distribution. Whilst the positive cost per worker reflects the comparative advantage of cheap labour, driven by high levels of unemployment in the Western Balkans, the negative coefficient of lack of skill is the result of a mismatch between the demand of the burgeoning services sector and new technologically based businesses and the lack of absorptive capacity. This is due in part to a failure of the education system to adapt to the changing skill set required in the working age population (Bartlett 2013). This suggests that any advantage gained by the cost of labour is dissipated by the lack of absorptive capacity to capitalise on any managerial or technological spillovers that might have been available. This may also be a demotivating factor in attracting FDI into the manufacturing sector.

It is only in the service sector that any consistently significant results are seen in relation to age and size of firm together with the influence of competition. Within the service sector, with the exception of the 90^{th} percentile of age, which is not significant, the results are positively significant for both age and size of firm. This may indicate that whereas manufacturing firms, particularly those that are older, struggle with a lack of skilled operatives and FDI, the service sector provides a major economic boost with older, larger privatised firms enjoying the benefits of FDI but the negativity of the competition coefficient suggests that they are suffering from newly acquired competitiveness in a

market economy. The negative influence of competition, significant from the 30th to the 90th percentile and, the fact that membership is seen to benefit the least productive firms, may allow the implication that, up to the median, any advantages are derived from the exit of uncompetitive firms and improvement of the survivors. Above the median the key influence is FDI.

The effect of loans, the results of which apply equally to both member and non-member firms, show that in both the full sample and manufacturing sector, loans are only significant at the bottom 20% of productive firms. This result is mitigated to some degree by the positive significance of rental capital up to the median and may suggest that as far as the manufacturing sector is concerned, there is evidence of market failure as the Western dominated banking sector is enforcing its enhanced credit scoring protocols, mitigated by the availability of collateral in relation to asset purchase. Within the service sector, loans are significant to the 60th percentile indicating a greater use or availability. However, this may indicate choice as, within manufacturing, leasing may be the better proposition, lack of collateral gives the service sector little choice but to rely on loans. This may also indicate that above the median the more productive firms are better capitalised, which may be the case in the service sector where the universal significance of FDI may imply the availability of capital. Equally the positive significance of balance sheet capital within the EU member firms manufacturing sector at 10th, 70th and 80th percentiles, may indicate a greater depth of capital availability. At the top end of the distribution curve this may also apply to non-member firms given the significance of balance sheet capital at the 90th percentile in the manufacturing sector loan results.

Overall, manufacturing gains less traction from both EU membership and loans than the services sector with the evidence suggesting little interest in the sector by foreign investors. There may be some evidence that rental capital (leasing) is a more important source of funds and that capital may be available further up the distribution curve. However, whilst the comparative advantage of cheap labour is apparent, so is the negative reality of a lack of manufacturing skills. There is evidence of older firms struggling while larger ones prosper, with institutional support seen as positive at opposing spectrums of the distribution curve. Manufacturing, at least in the BEEPS survey, is populated by low-tech SMEs and, with the increasing cost of labour in the Balkan region, firms may be losing some of their comparative advantage. Equally, it should be recognised that, prior

to the financial crisis, the Balkan region enjoyed significant inflow of funds, but this has reversed since and the 2013 BEEPS may well be reflecting this trend (Gabrisch et al. 2016).

In contrast, the service sector gains productive advantage from both membership and loans, supported by FDI, with positive gains being made by older, larger firms across the distribution curve. This may be due to the strength of the services sector in the economy, where it accounts for 66% of added value in Serbia and Kosovo, increasing to 79% in Montenegro, and is therefore likely to be a more attractive target for FDI. For example, in terms of gross value added (gross domestic product without taxes and subsidies) for 2009, 60% of GDP came from services with only 29% from industry and construction (Statistical Annual Report of Serbia 2008 pp.134). The newly created employment opportunities have mainly been in the service sector (financial intermediation, trade, real estate, rental services) with concentration on banks, shopping malls, betting shops and construction of luxury housing and business facilities. This kind of development is domestically based and ignores any potential for exporting (Žugić 2011).

It is therefore unsurprising that exports, which literature affirms positively influence productivity, have no support in either the manufacturing or services sectors. This echoes Gabrisch et al.'s 2016 findings that exports in the region constitute a small percentage of GDP.

This may be due to the low level of exports from seven of the eight countries, where they account for no more than 20% of GDP and, whilst there is evidence some countries are integrated into international production networks, some 60% of exported goods are from low-tech industries and tourism, where increasing labour costs diminish any comparative advantage (Shimbov et al. 2016).

Chapter 7 Conclusion

7.1 Introduction

Transitional economies have been encouraged by international agencies, the most influential being the World Bank and the International Monetary Fund stabilisation programmes, to achieve the transition from a command to a market economy. This includes macroeconomic measures, price liberalisation, privatisation, the adoption of hard budget constraints and the creation of open economies based on the free flow of FDI and the adoption of an export orientated foreign trade paradigm. The approach, known as the Washington Consensus programme, a descriptor conjured by Williamson (1989), claimed to encapsulate the preferred protocol for the successful development of an economic system based on capitalism. Initially it was adopted by South American states subsequent to the failure of the Import Substitution Industrialisation programmes in the 1980's and 90's, followed by attempts to alleviate the Asian financial crisis of 1997, claimed by some to have been created by a highly leveraged economic climate. More recently, elements of it have been used within the EU following the Eurozone debt crisis of 2009. The central theme of the programme is development assistance, including financial support, but conditional on reforms that meet the WC programme protocols. Critics claim that it has not succeeded in improving national welfare but created economic shocks that reduced the capacity of a state to achieve a sustainable socio-economic system. A counter project emerged, based on gradualism, which maintained that a gradual sequencing of reforms would create a more manageable economic paradigm, thereby creating a more acceptable socio-economic environment (Gabrisch and Hölscher 2006). However, any definitive judgement on the effectiveness or otherwise of the WC programme is potentially impeded by the lack of a control group with which to make a comparison.

The enlargement eastwards of the EU brought into sharp focus the neoliberal paradigm on which the institution is based. A number of economists claim that the Acqui Communautaire, which governs the protocols by which the Union operates, is essentially the WC programme internalised, and at times enhanced by the EU (Fitoussi and Saraceno 2013; Lutz and Kranke 2014). Based on this evidence, it has been possible to create a treatment and control group to measure, at least one aspect, of the efficacy of the programme. The transitional economies of Eastern Europe and Central Asia were all, to a lesser or greater extent, subject to the influence of the WC programme, the difference

being in its application by each individual state. However, one group of countries was subject to the full force of the programme, namely those which became members of the EU. Thus, it has been possible to compare the effect of the full programme on one group of states against its fragmented application on another. It is believed that this is the first time such research has been carried out and it is therefore a unique contribution to the WC debate.

This chapter is centred on the concluding remarks related to the five main themes of the research which are key to the Washington Consensus paradigm, namely EU membership, a proxy for the programme, FDI, international trade (exports), the availability of finance and innovation. The research concludes that the Washington Consensus programme and its key elements are efficacious to the performance of firms. However, there are identifiable applications which combine to create an environment within the new member states of the European Union which dissipate some of the advantages and have the potential to prevent the benefits accruing from firm performance into the economy as a whole. This identifies both important policy implications and a rich vein of further research that can be undertaken. The holistic and inclusive nature of the research is a contribution to knowledge but there are limitations in that it is dependent on survey and cross sectional data. It does, however, highlight the benefits of the programme at firm level whilst identifying constraints that impair any advantage contributing to national welfare. A conclusion that resonates with the current debates prevalent in the Western world.

7.2 Contribution to knowledge and debate

This thesis contributes to literature in a number of ways. It addresses an important issue within economic literature i.e. the effects of policy reform on economic progress, by focusing on a broadly pro-market agenda labelled the 'Washington Consensus'. It is, as far as the author is aware, the first study that evaluates the influence of the Washington Consensus programme by building on Fitoussi and Saraceno's (2013) paper which posited that it had been internalised by the European Union which established the *Acqui Communautaire* using its protocols. Unlike the majority of literature on the WC programme which examines the macroeconomic effect, this research takes a microeconomic approach and measures the productivity and profitability of firms utilising variables that act as proxies for the ten tenets of the programmes as identified by

Williamson (1989). This approach is predicated by Krugman (1994) who claimed that productivity was the key to a state's ability to improve national welfare. It has utilised the opportunity to measure the effectiveness of the WC programme by identifying a natural laboratory, namely the transition economies of Eastern Europe and Central Asia, where its effectiveness can be measured by comparing the performance of firms within the eleven new EU member states against the remaining 16. The majority of literature in this field is concentrated on the Latin American and South East Asia states where different historical development, ethnicities, cultures and political systems have the potential to distort any results achieved. This research compares and contrasts firms in countries which have a shared economic history, political culture and ethnicity providing a platform free of any potentially distorting effects. The importance of this comparative study is that all the transitional economies utilised some elements of the WC programme but it is only the EU members which were the subject of the full treatment effect.

The presence of treated and untreated firms provided the opportunity to add a further contribution to literature by using two treatment models which have not previously been utilised in this context. Firstly, a multi valued inverse probability weighted regression adjustment model which, using the potential outcome mean, compares the productive performance of firms within and outside the EU with the additional benefit of examining the interactive effect of foreign ownership, exporting, loans and innovation. Secondly, a quantile treatment model which allows the measurement of the effects of EU membership and key tenets of the WC programme across firms' productivity and profitability distribution curves. This model measures negative and positive effects surrounding the median as opposed to the mean which has the advantage of minimising the influence of outliers and heterogeneity. The disaggregation of the results into the manufacturing and service sectors provides an additional contribution to the debate.

The thesis also contributes to literature by combining, within the data chapter a macroeconomic evaluation of the transition economies which compliments the empirically based microeconomic research. The macro and microeconomic evaluations are contextualised within the literature review by introducing the political economy background to the transitional process and the ideological undercurrents which influenced the nation states. The advance of mathematics and specifically econometrics into mainstream economics has marginalised heterodoxy in the field. This research adds to

the economic debate by presenting context to the empirical work and introducing a tension between the political economy and the empirical results that allows a wider debate to ensue which includes institutions, history, political ideology and social structure.

The literature review presented in Chapter 2 introduces some key ideas that inform the empirical debate. The importance of the institutional development aspect of EU membership and its relationship with firm performance provides an important background to the interpretation of the empirical results. The political and ideological background to the WC programme in relation to the transitional economies creates a bridge to the empirical results enhancing the informative aspect of the discussion. Additionally, the role of FDI and the inclusion of the NMS into the single market emphasises the increase in competition to domestic firms, the danger of corporate state capture leading to asymmetric infrastructure development and the vertical nature of the investment into the manufacturing sector introduces IPNs and high transnational inputs into the production process resulting in the absence of an export multiplier. This informs the export results together with literature indicating the possibility that either an initial or no export premium exists within the EU.

The data used in the study is presented in Chapter 3 and provides a comprehensive macroeconomic discussion on GDP growth and per capital together with the influence of inflation allied to governance indicators covering government effectiveness, the rule of law, regulatory control, political stability and corruption. This chapter provides a continuing narrative of information that both informs the microeconomic empirical results and contributes to the unique holistic approach of the thesis. It also introduces the BEEPS survey which adds a further dimension to the unique nature of the research conducted in this thesis.

The first empirical chapter (Chapter 4) provides evidence that firms within the NMS are more productive than those not in membership of the EU and the addition of the interaction effect of foreign ownership, exporting, loans and innovation allows the measurement of the relative effect of each term in relation to membership and non-membership. This allows the conclusion to be drawn that the conditionality of institutional development to qualify for EU membership is the key element of the productive superiority of firms within the NMS with each additional interaction effect providing additional support. However, the results begin to dissipate in 2013 suggesting

that there may be a degree of convergence occurring. These results support Hartwell's (2013) and Becker et al.'s (2010) conclusion that the major influence is the institution of the EU itself and that strong institutional development, driven by an increasingly free market and enhanced by access to a market of 28 countries, is the main driver of both manufacturing and service sector profitability. The contribution made by this chapter is that the data used and empirical approach differs from these two papers and other research by the use of BEEPS survey data and an IPWRA matching model.

The second empirical chapter (Chapter 5) broadens the debate by switching from the mean to the median as the central point of the results with the added dimension of providing measurement across the distribution curves. Profit is also added as an additional performance measurement. The results confirm the contribution of EU membership to productivity and profitability growth but add an additional dimension showing that in both 2005 and 2013 it is the least productive and profitable firms that gain the most benefit, a previously unobserved feature. This seems to justify the WC claim that increased competition forces firms to increase performance to maintain or improve competitiveness and the findings suggest that this is particularly influential in firms furthest away from the production frontier. The dissipation of the effect in 2013 indicates that the bigger economic shock encountered immediately post accession has the greatest impact albeit that the trend continued in 2013 at a lower coefficient value. A further contribution is confirmation that productivity and profitability follow, broadly, the same pattern indicating that the most productive firms are also the most profitable.

The results also suggest that the service sector has gained the most from FDI with productivity and profitability showing growth in both 2005 and 2013. However, the manufacturing sector shows progress only in the upper part of the curve in 2005; but improving in relation to productivity in 2013 but declining in relation to profitability. If these outcomes are viewed in conjunction with the export results they chime with the presence of vertical investment and membership of IPNs in the manufacturing sector and the single premium applicable to exporters in the service sector. The manufacturing sector results are not significant in 2005 and negative below the median in 2013 in relation to productivity with profitability showing the same trend with the exception of some positivity around the median in 2013. These results conform to Borocz's (2012) findings of no benefit from FDI in the Hungarian economy with the evidence suggesting that the

IPNs dominance of the manufacturing sector with a high level of transnational inputs and output entirely for export has reduced added value to labour only and negated the opportunity for an export multiplier. This is an important contribution in relation to the policy makers of the NMS confirming the distorting economic effect of FDI into the manufacturing sector. On the other hand the service sector received a significant productivity and profitability boost in 2005 as a result of FDI which benefitted exporters in particular. However, the effect, in relation to exporting, had entirely disappeared by 2013. This conforms to two claims, the first by Eschenbach and Hoekman (2006) suggesting that the service sector had quickly achieved a degree of convergence with the EU15 and the second by Bellone et al. (2010) who found that intra-European trade enjoyed only an initial export premium in relation to firm level performance.

A similar relationship can be viewed between FDI and the performance of domestically owned firms. Within the manufacturing sector there is little evidence of any spillover benefit emanating from foreign owned firms into the domestic economy. This is the result of the sector being dominated by vertical investment and the expansion of the IPN network into the NMS where the high level of transnational inputs negated any necessity to share managerial or technological expertise with domestic firms. Any spillover effects observed by Javorik (2004) were limited to upstream firms in receipt of foreign investment. The service sector, on the other hand, did provide benefit to domestic firms at all points of the distribution curve, albeit limited to 2005. This was the result of service sector investment being horizontal thereby necessitating the involvement of domestic firms to deliver the product offering. The limitation of benefit to 2005 is possibly evidence of the convergence of the service sector with the EU15.

The effect of loans across both distribution curves and in both years is universal. This is clear evidence of the efficacy of loan receipt and therefore the need for a broad range of financial product to meet the needs of firms. However, the most important element of these findings is not in the results, but the evidence of market failure in the loan provision arena and the knowledge of the clear efficacy of receipt with evidence of scarcity is an important contribution to knowledge and a clear message to policy makers as to the need for intervention.

Chapter 5 is pivotal in allowing the influence of the key drivers of the WC programme, namely institutional development, free flow of funds and open markets to be observed

along the performance distribution of firms. This advantage is enhanced by the ability to apply this knowledge to the political economic consequences and to contextualise it for the benefit of both the academic debate and as a means of informing policy makers. Additionally, it raises further research questions which will provide greater insight into those areas where conclusions remain somewhat speculative.

The final empirical chapter (Chapter 6) concentrates on the Western Balkans and uses both the IPWRA and QTE models. This chapter uses an expanded number of variables and therefore contributes a robustness check to the other two empirical chapters. The results for the advantages of EU membership are more muted in the Western Balkans with the top 30% of manufacturing and 20% of the service sector firms showing no benefit. There is also evidence of convergence with non-member firms which could be anticipated given that the non-member states are already in the accession process. The influence of loans is limited in the same way, albeit, the positive benefit of rental capital (leasing) within the manufacturing sector is an indication of the potential benefit of this form of finance. The universal positivity of cost of labour across the distribution curve justifies conclusions already drawn about the comparative advantage of cheap labour, although a similar but negative result for skills within the manufacturing sector is not necessarily echoed in the wider sample. The positive effect of FDI is limited to the service sector with no evidence of any export premium. The negative effect of competition is seen only at the top of the service sector productivity distribution curve and given that the in excess of 60% of FDI went into the service sector it is not surprising that pressure would have been intense amongst the most productive firms. This chapter, in addition to its contribution as a robustness check, provides evidence of convergence between similar states already within the EU and those in the accession process indicating that it is institutional development that is key to firm performance improvement. This, allied to evidence from the full sample, provides clear guidance to both EU and Western Balkans policy makers that should inform the strategic direction of the accession process.

The major contribution of this thesis is the microeconomic emphasis of the research on the influence of the WC programme, as internalised by the EU, on firm level performance in the environment of the transitional economies of Eastern Europe. This has served as a natural laboratory where the productivity and profitability of firms can be compared with a virtually identical peer group. The research is enhanced by the context provided by the

macroeconomic descriptive statistics and the study of the political economy created by the ideological nature of the neoliberal movement which spawned the WC programme and influenced all the transitional states to some degree, particularly in the area of privatisation. There is a tension within this work where the empirical results are informed by the realities exposed by the literature on political economics and the embrace of neoliberalism. The research concludes that the WC programme, successfully promoted, improves firm performance yet an eminent body of literature suggests that it does not improve national welfare. The implication is clear, that the distributive mechanisms of wealth and income are not robust enough to transfer an equitable proportion of firm success to both government and the population at large. The research, therefore, not only contributes to literature but informs policy makers as to where the emphasis should be placed in the search for a more equitable society.

7.3 European Union Membership: the positive benefit of EU accession to institutional development

The combined effects of accession should increase productivity and improve national welfare. Essentially, the privatization process, foreign imports, and the establishment of a free market would be expected to increase competition amongst firms, although to become competitive and maintain competitiveness it is necessary to produce a quality product at the right price. Failure to do either leads to market exit. The availability of foreign direct investment (FDI) introduced improved management and technology, access to markets and encouragement for domestic firms to improve productivity, particularly those supplying foreign-owned entities. An enlarged free market and customs union also provided the opportunity to export to previously inaccessible destinations, where increased competition demanded productivity improvement. The expansion of foreign banks into the new member states (NMS) increased credit availability, providing further impetus for increased efficiencies, and there is evidence that the successful establishment of a free market and vibrant business environment forced the development of supporting institutions to uphold the new economic paradigm (Hartwell 2013; Djalilov and Hölscher 2016).

The IPWRA model revealed that, in 2005, firms within the NMS were more productive than their non-member peer group, even when they were not foreign owned, in receipt of loans, innovators or exporters, an advantage which improved when an additional variable

was added. This would suggest that the key influence was the result of the accession process, improved institutional development, financial intermediation, and the creation of a service base capable of supporting a market economy. The relative coefficient values of EU firms without an additional treatment, confirmed the supremacy of membership as the most important influence on productivity.

The disaggregated results indicated that services had a greater advantage than manufacturing, which reflects the transformational effect of the EU's institutional reform protocols. The inclusion of an additional treatment variable enhanced that advantage, confirming the influence of FDI, exporting, innovation and the availability of loan finance. These influences were also evident when comparing treated and untreated firms both inside and outside the EU. A comparison between the relative values of each of the additional treatment variables indicated a similar effect with no evidence that any single one is particularly influential.

By 2013 substantial convergence had occurred, illustrated by a reduced productivity gap or a lack of significance in the results. There is evidence that the influence of the additional variables was broadly maintained, indicating that the convergence process was the result of either a dissipation of the membership effect, an improvement in firm productivity amongst non-member states, or a combination. Additional reasons may have been the effect of the Eurozone crisis on firms in member states and the recognition by non-member states that, in order to compete in a global market, it was essential to adopt the same EU practices. Outside the EU, the advantages presented by FDI, the propensity to export, access to finance, innovation, and the availability of human capital had been broadly maintained.

The QTE model measured firm productivity and profitability ranking them along a distribution curve; the most productive at 90% and the least 10%. It measured the effect of EU membership on these firms against a control group with the same characteristics, but not in the NMS. In both 2005 and 2013 the results indicated that the least productive and profitable achieved the greatest improvements; the highest value coefficients being seen in 2005. The disaggregated samples showed the same trend but with markedly different results. In 2005, in relation to productivity, results indicated that the service sector had higher coefficient values at the top and bottom of the curve, with those around the median being broadly similar. In 2013 however, the manufacturing sector had the

higher values and succeeded in maintaining those levels which, outside the bottom 20% of firms, were higher than 2005. In contrast, values in the service sector saw a steep decline. A similar picture was apparent for profitability.

The results conform to the IPWRA model, confirming the positive benefits of EU membership. In relation to both productivity and profitability, the greatest advantage was to firms with the lowest performance records. The intention of the EU, and one of the main tenets of the WC programme, is to create a competitive market by liberalising trade and financial flows. This would intensify the pressure on the least successful firms from foreign imports and horizontally investing foreign firms, to improve both product and productivity, or exit the market. The diverse institutional environment, together with a degree of state capture, created developmental models in which economic shocks threatened to destabilize economies and long-term development. The Czech and Slovak Republics and Hungary all experienced significantly reduced exports. Hungary and Latvia sought emergency support from the IMF, and Poland suffered a 30% currency devaluation: all resulted in increased unemployment and reduced aggregate demand. This indicated significant attrition, but the results revealed that the survivors experienced substantial benefits.

The deteriorating performance improvements towards the most productive and profitable ends of the curves, could have been due to proximity to the production frontier: the closer to the frontier, the smaller the opportunity for gain.

The service sector results in 2005, for both productivity and profitability, provided a clear indication of the transformation that had occurred in the transition from a command to a market economy. FDI was brought into the sector necessitating the introduction of services not previously utilised and involving new competencies and technology in an environment where it had been more difficult for foreign entities to protect their intellectual property. However, the steep fall in coefficient values between 2005 and 2013 indicated an immediate and positive effect, followed by a plateauing of improvement post the introduction of new processes and techniques. In contrast, manufacturing firms maintained and improved their performance, particularly towards the top end of the curve, suggesting a significant level of privatisation of state-owned firms, which were quickly incorporated into IPNs and benefitted from the managerial and technology improvements introduced by foreign owners. In contrast to services,

performance improvements in the manufacturing sector took longer to become effective, due to the longer lead times involved in the change process (Böröcz 2012).

The Balkan study results display similarities, with some evidence of greater convergence between member and non-member firms. This may be the result of non-member states being in the accession process and therefore compliant with aspects of the Acqui Communautaire. The acceleration of institutional development, allied to a degree of market liberalisation, may have contributed to an improvement in productivity at firm level.

The influence of other conditional variables is discussed below, although the observed results are neither as definitive nor conclusive as those for EU membership. They indicate that accession to the European Union and the building of effective and robust institutions is the key to improved productivity and profitability and justifies the claim that the first hypothesis is proven.

There is a potential causality issue as the NMS had a higher GDP than other transition economies and are closer geographically to the EU. It could therefore be argued that they self-selected into the accession process. However, economic theory favours the argument that EU membership improves productivity. The significance of the flow of FDI into the NMS led to a large foreign ownership presence, with the comparative advantage of cheap labour, management expertise and technology that enhanced productivity.

The opening of domestic markets to foreign imports forced domestic firms to improve productivity or exit the market. EU member firms, albeit mainly foreign ones, had the advantage of joining the largest single market and customs union in the world, which brought access to international production networks (IPNs) and a significant increase in exports. It is therefore not unreasonable to conclude that, since it is a stylised fact that competition and the propensity to export go hand in hand with productivity, and arguably profitability, membership of the EU has brought improvement.

7.4 Ownership: foreign and domestic ownership and the influence of FDI

The influence of ownership was measured by evaluating the effect on productivity of foreign and domestic ownership with the former examining the effect of FDI and the latter any evidence of technological and know how spillovers. Motivation for FDI is divided

into three categories: (i) horizontal, when investment is internalised; (ii) platform, when the objective is exporting; and (iii) vertical, when the purpose is to utilise the comparative advantage of a country within an international value chain. In the accession economies of Central and Eastern Europe, emphasis was on the vertical and platform for manufacturing and on horizontal for services. Literature indicated diversity between industries and firms within sectors, some finding little spillover to domestic entities from the presence of either foreign firms or capital. Productivity appears driven by foreign firms with their superior technology and management, along with the exit of less productive domestic firms (Greenaway and Kneller 2005).

The IPWRA model measured only foreign ownership in relation to productivity. In 2005, the absolute analysis found that the service sector gained more from membership of the EU and FDI than manufacturing, with no evidence that FDI contributed any benefit. Outside the EU, only the service sector provided a significant result. In relative terms foreign owned firms within the EU, in both the manufacturing and service sectors, had a productivity advantage over domestic firms. Broadly the same coefficient values conformed to those observed in firms in the service sector outside the EU, suggesting that, within the context of a national business environment, the benefits of FDI were comparatively constant. However, when foreign owned firms within the EU were compared with those outside, the productive advantage was clearer, although this seemed more attributable to EU membership than foreign ownership.

In 2013 there was evidence of convergence in relation to the membership effect. A comparison of domestic firms within the EU with foreign owned firms outside, was not significant.

The comparison between foreign owned firms continued to show that EU based firms had a diminishing advantage, confirming that it was membership and not foreign ownership that had dissipated. A comparison of domestic and foreign owned firms within the EU, revealed the growing influence of foreign ownership.

More detail was provided by the QTE model. In 2005 and 2013 foreign ownership improved service sector productivity outside the bottom 20% of firms with the effect increasing the more productive the firm, and a similar result was seen for profitability. In contrast, in 2005, the bottom 60% of foreign owned manufacturing firms did not exhibit

any performance growth although there are sizeable gains amongst the most productive and profitable. In 2013, with the exception of the 90th percentile, manufacturing firms had improved their productivity performance across the distribution curve with a rising coefficient value trajectory. However, profitability improvement was more muted and seen only in the bottom 20% of firms and at the 80th percentile, all at high values.

In 2005, outside the least productive 20%, service sector domestic firms showed an improvement, although profitability improvements were seen in the top 40% only. These results were not sustained, showing no significance in 2013. Manufacturing firms showed no gains for either productivity or profitability in 2005 and demonstrated little improvement in 2013; productivity improvement was evidenced only at the 30th and 40th percentiles, becoming negative at the 90th.

When interpreting the results, it was important to distinguish between the IPWRA and QTE models. The former measured performance of one set of treated firms against a similar untreated group, whereas the latter measured the growth achieved as a result of the treatment. Foreign owned EU member firms were revealed as more productive and profitable than domestic firms, whether in the EU or outside, which conformed to claims in literature that FDI benefits firm performance in host countries. In addition, the QTE model allowed an analysis of sectoral productivity and profitability growth as a result of FDI and therefore, by definition, its effect on domestic firm productivity.

In the service sector, where productivity and profitability growth was evident across both curves, the primarily horizontal investment made in mainly privatised firms brought with it technological and managerial expertise which improved performance.

The liberalisation of markets and improving institutional development demanded a different paradigm of service delivery than under a command economy, together with the additional products necessary to support an outward looking demand economy. It is therefore not surprising that, with foreign assistance, an industry, some distance from the production frontier, developed a level of service excellence capable of supporting a liberalised market and manufacturing sector populated by foreign entities (Eschenbach and Hoekman 2006; Hartwell 2013).

The nature of FDI into the service sector was such that the protection of intellectual property and technology was more difficult, which provided an opportunity for domestic

firms to take advantage of potential spillovers. The QTE results suggested that, in 2005, 80% of the most productive firms obtained some benefit, although this reduced to 60% in relation to profitability. However, this benefit appeared limited to the immediate post accession period when de novo firms produced products of a quality and price capable of competing with foreign entities (Arnold et al 2011; Fernandes and Paunov 2012). Why this advantage had dissipated by 2013 is difficult to understand, although one possible explanation is that convergence with firms in the EU15 had already been achieved.

In relation to manufacturing, there are important caveats attached to the attraction of FDI. A significant proportion was initially devoted to the privatisation process and the opportunities presented by the comparative advantage of cheap labour. Multinational manufacturing enterprises expanded their supply chain by incorporating the NMS into IPNs, thus boosting exports. However, the business model involved consisted of a significant element of extra national inputs, leaving only labour to supply the value added. These inputs provided little added value so, if cheap labour alone provided the productivity boost, it was likely to be lost in the price-cost ratio and the opportunity for an export multiplier. Essentially, the quantity of imported inputs reduced the value added to a level which diminished the profit available and reduced the impact of exported goods in the economy. The domination of imported material in the assembly process not only impacted the export multiplier but reduced the opportunity for forward and backward linkages with upstream and downstream firms, as a result of MNEs restricting activity to specific processes. Additionally, margins may have been influenced by currency and internal transfer pricing protocols (Howard-Jones et al. 2017).

This may explain the results observed in the manufacturing sector. The IPWRA results confirmed the maintenance of the supremacy of foreign owned entities against their non-member peer group and domestic firms within the EU. However, the QTE model showed that, in 2005, performance growth was limited to the top 40% of firms. By 2013 manufacturing productivity had improved, with the exception of the 90th percentile, suggesting a consolidation of knowhow and technology over the intervening years. The results for profitability were more nuanced. Albeit at higher coefficient values, significance was seen only in the bottom 20% of firms and the 80th percentile. This was almost certainly due to sectoral factors. The failure of MNEs to capitalise on productivity gains may have been due to the financial and Eurozone crises, when reduced demand in

Europe affected profitability, firms' hoarded labour and experienced the phenomenon of variable costs being stickier in recession than expansion.

With the data available, it was not possible to identify whether these firms represented vertical or horizontal investments, the difference being those MNEs seeking greater efficiency and those seeking local markets (Markusen 1995). There is some evidence from Bevan and Estrin (2004) that unit labour costs, allied to distance, are the key determinants of FDI into the NMS, providing lower transaction costs and the ability to manage production facilities over short distances, all favouring vertical investment. The privatisation process allowed foreign MNEs to identify potentially attractive firms and it is possible that part of the selection process related to firm performance (Damijan and Knell 2005; Roberts et al. 2008). Hence, there may have been an element of self-selection where the better performing firms became foreign owned. The role of the privatisation of state-owned companies was a key factor in the transitional process, which economists had assumed would result in improvements in firm-level performance. In reality, the result was more nuanced**,** as firms taken over by foreign investors exhibited substantially greater productivity than those in domestic ownership (Böröcz 2012). Literature shows that a more competitive market results in improved productivity, and EU membership intensifies the competitive environment (Bridgeman 2010). Within the NMS, there is evidence that "a well-designed and well implemented competition policy had a significant impact on TFP [total factor productivity] growth" (Buccirossi et al. 2013 pp. 1334). The influence of competition also resonates with international trade as larger, more productive firms grow in size and become more efficient.

In evaluating the almost universal lack of significance of the results for domestic manufacturers, it is clear there is no evidence of spillovers effective enough to improve either productivity or profitability. Görg and Greenaway (2004) suggested that MNEs may be adept at protecting technology and intellectual property, spillovers may exist but are subsumed in overall growth models, and the heterogeneity of firms may make the specific identification difficult within an empirical environment. Javorik (2004). Damijan et al. (2003) found evidence of backward linkages, but only when there was a relationship with a foreign investor. Therefore, this research follows Stančík (2007) by finding negative backward and horizontal spillovers from FDI. This could indicate that foreign

owners are protecting their intellectual property and not disseminating any benefits to domestic firms.

The second hypothesis that foreign firms are more productive and profitable is supported by the findings in this research.

7.5 Export: the failure to achieve an export multiplier

The characteristics of exporting firms suggest they are more productive, capital intensive, larger in size, and employ more people at higher wage levels than non-exporters. The determination was whether there was a causal effect, or whether firms self-selected as exporters as a result of performance and asset-based characteristics. The focus on exporting in relation to productivity is important as it highlights the superior performance of exporters. Associated with firm growth and survival, it is essential in the context of institutional support for smaller, new exporting firms (Wagner 2012).

In both 2005 and 2013 the IPWRA results indicated that, once the effect of membership had been removed, EU exporters enjoyed a small premium against non-exporting firms outside the EU, with a greater effect seen in services than manufacturing. There is evidence that the export premium was higher in firms outside the EU. In 2005, when exporters within and outside the EU were compared, the results showed a significant advantage to EU member firms; the service sector having the higher coefficient values. The results not being significant in 2013 suggested a degree of convergence. Comparison between EU exporting and non-exporting firms revealed a consistent premium for both 2055 and 2013 for the service sector, with the manufacturing sector showing no significance in 2005 but recovering by 2013.

In relation to the contribution of exports to productivity and profitability growth, in 2005, the service sector improved against both criteria, but this was not maintained into 2013 when no significance was seen, and the bottom 20% of profitable firms became negative. In relation to productivity in 2005, manufacturing showed no significance, with the exception of the 30th percentile which was negative.

The position was similar for profitability, showing a negative trend at the 10th, 30th and 60th percentiles. The negative productivity trend continued in 2013 while the profitability result showed growth only around the median percentiles.

The service sector results support Bellone et al. (2010) who found that intra EU exporters achieved a single productivity boost immediately on commencing exporting. This may have coincided with the investment by foreign entities who saw the benefits of outsourcing and offshoring service functions to the NMS. Such investment brought management and technology that provided an immediate boost to privatised and de novo firms, who quickly reached optimal efficiency. It is important to note that the measurements observed relate to comparative results or growth profiles and not to the actual level of productivity. Thus not significant results do not necessarily imply low productivity (Marin 2006). However, Damijan and Kostevc (2006) also found that intra-European exporters had no exporter premium. The manufacturing sector result was related to the predominance of vertical investment in IPNs. The reality of global supply chains is that more intermediate inputs are traded across borders than final and capital goods, and that they are destined to contribute to a finished good or a further enhancement destined for use in exports (Feenstra, 1998). There is now a dichotomy between where the completed good is produced and exported, and where value is added and recognised. There are many examples of assembly line exporters where value added occurs elsewhere and the process neither recognises its true productive or profit contribution nor contributes to an export multiplier.

Two cases have been well documented, namely the mAcquisladoras on the US, Mexican border and Foxxcon's production of the Apple I phone in China, where the value added is limited to cheap labour (Palma 2005; Gereffi 2014). There is evidence that firms within IPNs, who were the predominant manufacturing exporters in the NMS, suffered from similar applications of the same business model (Borocz 2012).

The claim of the third hypothesis that exporters are more productive, has only limited support in this research. This indicates that the significant flows of FDI into the NMS were designed to capitalise on the comparative advantage of cheap labour, which, allied to the significant use of transnational inputs, created an environment in which an export multiplier was elusive.

7.6 Loans: the efficacy of loans and the constraint of market failure

Access to finance is essential to fund investment, both to ensure that businesses reach their full growth potential, and to facilitate new business start-ups. A study by the World

Bank reveals that in emerging markets more than 50% of small- and medium-sized enterprises are credit constrained, 70% do not use external financing from formal financial institutions and, of the 30% receiving credit, 15% are underfinanced from formal sources. Information asymmetries suggest the existence of credit gaps and insufficient available credit for all but "bankable" propositions. Information asymmetry, in the form of adverse selection and finance rationing, can also occur when banks require collateral and are a source of market inefficiency in transitional countries, leading to low-risk borrowers such as SMEs being side-lined or even excluded from the stream of potential lenders. In theory, finance contributes to economic growth in five key ways: the availability of savings, investment information, risk management, due diligence processes, and by facilitating trade in economic commodities and services. These concepts provide ample motivation to suggest that finance has an important role to play in transition (Levine 2005). The results of the effect of loan receipt on firms, from the most to the least productive, was measured against those without loans. In 2005, firms in receipt of loans demonstrated improved productivity, which appeared uniform throughout, suggesting a universal benefit regardless of a firm's position in relation to its productive efficiency. There was some indication that the most productive gained the most, although this effect had dissipated amongst the top 10%. By 2013, the influence of loans was most beneficial to the least productive, albeit marginal, and the results also suggested that loans had a stronger effect on firm performance in 2013 than in 2005. This may indicate that improved financial intermediation had created a more efficient lending process making access to finance easier for those applying, or that capital was more important than loans in the most productive firms.

In 2005, the statistics were broadly similar across regions and sectors in transition economies. Over 90% of firms, regardless of size, claimed credit constraints: 43.7% of SMEs and 35.1% of large firms surveyed by the World Bank and European Bank for Reconstruction and Development stated that the obstacles were major or severe. Within the NMS, the figures were comparable, with 45.1% of SMEs and 31.6% of large firms stating that credit constraints were major or severe. A total of 81.4% of the sample were SMEs, of which 95% reported some obstacle to accessing finance. It is therefore evident that a financial intermediation problem existed in the NMS and in the transitional economies as a whole. This may have been due to credit constraints imposed by state-owned and foreign banks employing enhanced credit-scoring criteria, which penalize

SMEs, start-ups, and other firms lacking collateral. Given the importance of loans across all sectors, a strong financial sector was essential for economic growth. The evidence of market failure was problematical.

Within the NMS, 43.9% of the total sample were in receipt of loans; 40.1% of SMEs and 62.8% of large firms. The figures for non-EU member states were marginally lower, but not significantly so, suggesting this was a universal problem throughout the region. There was evidence of the importance of loans to firm-level performance, and the number of firms struggling to access finance was of concern. These non-borrowing firms were more likely to have been new firms, which displayed more resilience and learning capacity than their older more experienced competitors, and often represented sectors where development should be supported. In 2013, in relation to firms within the NMS in receipt of loans, the position for large firms was unchanged with a 2% improvement for SMEs. Given these results, it was surprising that the percentage of firms claiming difficulty accessing finance had reduced. Those claiming constraints within the NMS had dropped to 49.5%, and 54.8% for non-NMS firms, and those indicating that the problem was major or severe had fallen to less than 20%.

There was evidence that the presence of foreign banks had created an environment where SMEs were discouraged from applying for loans because, given the credit scoring criteria and the demand for collateral, they expected rejection. However, the degree of rejection measured throughout Eastern Europe was less than 3%, and only half actually admitted to having applied for a loan. A selection effect was clearly present: the expectation of rejection resulting in non-application. Those applying tended to be larger firms, exporters and innovators, and since results showed that they were amongst the most productive, it was not unreasonable to suggest that they applied in the expectation of being accepted.

The fourth hypothesis that firms in receipt of loans are more productive and profitable has been universally proven both within and outside the EU. However, the real issue was whether the poor uptake of loans was a reflection of market failure and therefore an issue which policy makers should have addressed.

7.7 Innovation: the need to build national innovation capacity

The endogenous growth theory posits that economic growth results from internal as opposed to external factors, which includes the development of education and human

capital. This leads to increases in absorptive capacity allowing the development of innovation strategies, which contribute to growth through improvements in productivity. Innovative firms, both within the EU and outside, demonstrated enhanced productivity profiles over non innovators. Within the manufacturing sector, results in 2005 were better than in 2013 indicating that it may have benefitted from the immediate injection of FDI and taken advantage of structural funds and the PHARE programme, which concentrated on areas that would bring export enhancing jobs to the region. Innovators within the service sector virtually doubled their advantage between 2005 and 2013as they made the transition from supporting a command economy to that of a market economy with the need to acquire new skills before being capable of absorbing new and innovative techniques. Thus, it might be concluded that manufacturing was in a position to embrace innovation earlier than the service sector. Within the EU, the advantage of both sectors' innovators was constant across both years at between 2% and 4%. A comparison of the results of innovating and non-innovating firms both within the EU and outside, indicated that innovators in non-EU states had a greater advantage than those within the EU. However, the innovation premium achieved did not appear to do justice to the initiatives undertaken and may indicate a dilution of national innovative capacity within the NMS.

The creation of an effective R&D strategy both nationally and within firms, was dependent on a degree of technology diffusion, absorptive capacity and market demand. Within the EU, results suggested that the NMS were failing to provide a platform for innovative firms, with the skill and technology required to enhance their performance and embrace the need for research and development. This would suggest a failure to build national innovation capacity, which may have resulted from a concentration on FDI and the subsequent distortion of infrastructure expenditure biased towards the needs of MNE's and away from the education infrastructure required to build absorptive capacity (Pavelnik 2016). Radosevic (2004) claimed there was a lack of demand from the business community. However, the dominance of MNEs and their reluctance to share technology, demonstrated by a lack of evidence of spillovers, created an environment akin to corporate state capture, which has drained the political will to effect strategies that bring about the necessary change.

Outside the EU, the break-up of the Soviet Union and the dismantling of a formidable state run R&D strategy, exacerbated by the shock privatisation of highly vertically

integrated state owned enterprises, led to gaps in the value chain, which made the implementation of business based innovation initiatives difficult (Suuma and Kattel 2010). Nevertheless, there was some evidence that the R&D premia achieved were on par with firms within the EU, and the lack of significance in the 2013 comparison between EU and non-EU innovators, indicated that a degree of convergence had occurred. The fifth hypothesis is that innovative firms are more productive, and results indicate that this was the case both within and outside the EU. However, whilst in 2005 innovative EU firms were more productive than their non-EU peer group, the effect had dissipated in all sectors by 2013.

7.8 Firm Characteristics: the influence of age and size on firm development

The common approach to age and size of firm is to assume that they represent alternative dimensions of the same characteristic. However, there are significant differences in how they influence performance. Older, larger firms are more productive, either due to their knowledge, experience and market power built over the years, or because they are able to take advantage of economies of scale and network effects (Coad et al. 2013).

Results confirmed that age had a particular effect on both productivity and profitability with a heterogeneity at different points of the distribution curves. In 2005, it was largely either insignificant or negative, with negativity coming at the top end of the curve for both manufacturing and service sectors. This suggested that older, more productive and profitable firms were losing ground; the only exception being in the service sector where age had a positive effect on the top 10% of firms. In 2013 the picture was similar, with the most negativity observed at the lower end of the distribution curves. The notable exception being that age showed a positive influence in the manufacturing sector for the top 10% of productive and profitable firms.

The effect of size was different, particularly in manufacturing. In 2005, it was positive in the top and bottom 20% of productive firms and in the top 30% of the most profitable. In contrast, the service sector was either not significant or negative, with the most productive and profitable firms displaying the greatest degree of negativity. In 2013, the picture in the manufacturing sector was more nuanced. Outside the top and bottom 10% of firms, size had a positive effect on productivity, but in relation to profit below the median, results were negative, with only the top 20% of firms showing a positive

response. Within services, the influence of firm size on productivity remained not significant or negative, although in relation to profitability, the results were positive across the distribution curve.

Larger, older firms will have been state owned enterprises (SOE), privatised in whole or in part and bought by foreign or domestic buyers. Accustomed to a supply side command economy where the profit motive was subservient to capacity and full employment, they were buoyed by the soft budget options available to SOEs. In contrast, those that became foreign owned or were de novo firms had an organic rather than an acquired profit motive and it may be that, where positive results were observed, they were driven by these two classes of firm. Furthermore, the older, larger firms, which had been broken up and sold piecemeal, may have struggled with increased competition causing pressure on price cost margins, which in turn made it difficult to acquire new technology due to financial constraints. The combination of a lack of evidence of spillovers, the difficulties of financial intermediation and the concentration of the state on FDI, made the progress of older, larger domestic firms increasingly difficult in a liberalised market environment. Whilst there was limited evidence of gains at the most productive and profitable ends of the distribution curves, where economies of scale and network effects may have gained traction, the results did not, universally, conform to literature, indicating that the transition from SOE may have resulted in some attrition amongst privatised older, larger domestic firms. This may have resulted from the states' emphasis on FDI and a degree of corporate state capture by MNEs creating asymmetry in infrastructure development.

7.9 Limitations and Gaps

The key limitations of this research is that it is an empirical investigation, but based on survey data, which is qualitative by nature. There is danger, particularly amongst entrepreneurs, for answers to be self-serving and therefore not indicative of the population at large (Hashi and Krasniqi 2011). This is evidenced by the caution with which this research approaches the profitability results and the caveats previously noted. However, there are a number of high quality papers using BEEPS data and a list can be obtained from the EBRD using the link provided at page 323.

There are some other key limitations to consider in relation to this research. Since there is a lack of longitudinal data, this is a cross sectional study. Panel data does exist within BEEPS, but there is no evidence of any meaningful work using it, and the change in

questionnaire and methodology between 2005 and 2013 provided a degree of misgiving in relation to its use. The researcher was therefore unable to measure the dynamics of membership and the effect of conditional variables over time. What is presented are two snapshots from the two dates studied. The results are based on matching models; causality issues may thus arise from unobservables that are not identified. These issues may also result from the cross-sectional nature of the data. Due to the limited number of observations on service sector capital and skilled workers, it was not possible to measure the influence of either financial or human capital on the full sample. Whilst the research does consider spillover effects, the underlying assumption of matching estimators is that there are none. This is a common limitation in any study applying matching estimators. Cerulli (2010) notes that the issue of dealing with spillovers is foremost associated with the problem of operationalizing them i.e. designing an appropriate measure. Thus, any such observations must acknowledge this potential limitation.

It is also possible that the selection of the NMS for accession to the EU was based on the strength of their GDP per capita; all being higher than the transitional economies of the CIS or the pre-accession states of the Western Balkans. Therefore, any productivity differentials were already extant. However, evidence indicates that the least productive firms gained the most from EU membership, which confirms that by opening up markets to competition, firms were forced to improve or exit, and that improvers made the most significant productivity gains. To gain more insight into the productivity performance of domestic firms, there is scope for further detailed research.

7.10 Summary and Policy Advice

In summary, firms within the NMS are more productive than those in non-EU member states, indicating that the protocols of the Washington Consensus, introduced in the accession process, improved productivity thereby providing a platform for survival and further development within the enlarged free market. However, there was evidence that firms gaining the most were amongst the least productive, implying that the introduction of a competitive environment forced them either to improve their performance, or exit the market. As the least productive made their exit, the perceived performance of the survivors showed improvement, thus potentially exaggerating the actual gains made. An exception was the performance of firms either owned by or with a substantive foreign investor, where the more productive the firm, the greater the performance enhancement.

FDI undoubtedly brought benefits to the transition economies. However, the substantive nature of the flow of funds and the introduction of the NMS to IPNs, did not yield the anticipated economic benefit, with high foreign inputs reducing value added components, thereby diminishing the opportunity of an export multiplier. This in turn diminished the potential role of local domestic suppliers, reducing the opportunity for managerial and technology spillovers. The attraction of FDI led states into a competitive environment to attract foreign investors, which in turn led to corporate state capture, gearing taxation and infrastructure to their demands. The resulting revenue loss, along with the asymmetric development of infrastructure and institutions, had a detrimental effect on the development of absorptive capacity and national welfare. Equally, the volume of FDI may have crowded out domestic firms causing greater attrition than previously thought.

The dominance of international production networks within manufacturing exports, has resulted in an over reliance on transnational inputs, which not only reduced value added, since the only contributor was labour, but curbed the potential for technological spillovers to domestic firms. There may have been further distortions relating to transfer pricing, currency exchange and a reliance on labour as the only value added in the mix (Borocz 2012). Businesses enjoying idiosyncratically low input prices will appear to be hiring fewer inputs per unit output (Katayama et al. 2003; Gorodnichenko 2005).

Firms in receipt of loans were more productive. This may have been a selection issue, as higher performing firms were more likely to receive loans. Although less than half of SMEs were in receipt of a loan, about 50% had not applied, either in anticipation of refusal or because it was not required. The evidence of market failure, which may have impeded the ability of firms to increase productivity, indicates the need for improved financial intermediation. There is, however, evidence from the Balkans that lease finance may provide an alternative in the manufacturing sector, with the availability of collateral built into the transaction.

Innovative firms are clearly more productive. The historical business model for research and development in the former command economies of Eastern Europe, was based primarily on the state. To some extent this has continued using the PHARE programme, but greater emphasis should be placed on firm level involvement in research and development programmes.

Overall, EU membership benefits firms. However, certain aspects of the way in which the *Acquis Communautaire* was implemented, particularly the lack of control of FDI flows, the underdevelopment of financial intermediation, and the exploitation of host country comparative advantage, negatively impacted the national welfare of the NMS and the productivity of domestic firms.

Results have several policy implications for both member and non-member states. There is little doubt that further enlargement of the EU to include the Western Balkans, would be a major boost to their economic development and provide a route out of localism rooted in the ethnic and ideological forces in the region.

Both membership and loans appear to have benefitted the least productive firms, with services gaining the greatest traction. There is however a need for greater emphasis on the manufacturing sector, where rental capital was positively effective amongst the least productive firms, and where enhanced financial intermediation would improve supply and provide capital for technical innovation to improve productivity. Whilst intermittent, the negative influence of replacement capital was problematical in manufacturing, so support for an asset-replacement programme appeared desirable. As 90% of the sample consists of SMEs, there is clear evidence of where improvement can be achieved amongst the least productive.

The success of the service sector in attracting FDI should encourage governments to improve the manufacturing environment. A programme of modernisation incentives should stimulate productivity improvements leading to an improved environment for FDI. The paucity of skilled workers must be addressed, and whilst low labour costs provide a comparative advantage, income levels need to be increased to encourage the development of a higher skill base. Equally, there is need to improve the quality of management to ensure that a more skilled cohort of managers is available, together with an appropriate slice of the economic cake (Adalet McGowan and Andrews 2015, p.32).

7.11 Future Research

The effectiveness of firms is the bedrock of a successful economy. This research has therefore concentrated on firm level performance to establish whether evidence exists that the WC programme enhances productivity and profitability. In an absolute sense, the conclusion reached is that it does and, if firm level performance were enhanced, a

consequential improvement in national welfare could be anticipated. Evidence revealed that this improvement did not occur to the degree anticipated which, given the clear advances in performance, implies that other forces are at work. This may be the result of corporate or political state capture and a failure to address essential infrastructure, particularly education and the improvement of social mobility.

Questions meriting further research:

Has the level and nature of FDI resulted in corporate state capture, distorted infrastructure expenditure and adversely impacted on areas such as education, to improve absorptive capacity?

Has the apparent failure of domestic firms to improve productivity resulted in firm exit, reduced wage rates and increased unemployment and subsequent migration?

Has the apparent selective imposition of the protocols of the *Acquis Communautaire* reduced the ability of the NMS to achieve meaningful convergence with Western Europe?

Is the absence of loan finance in the majority of firm balance sheets the result of market failure or an alternative source of funds?

Evidence of state capture and the use of compradors by MNEs provides evidence of "efficient grease". Did this amount to corruption?

Further work should also include work force composition, skills and educational attainment, wage costs, income, employment characteristics and inequality. There may be an opportunity to revisit the South American experience against the same control group of the former Soviet Union, to contribute further to a debate that did not achieve closure: the goal being to identify empirically where the productivity and profitability premium enjoyed by firms, is being prevented from raising the welfare of the population.

In approaching this work, it would be useful to follow other avenues of econometric modelling. For example, the measurement of firm level technical efficiency has become commonplace with the development of frontier production functions. Thus, the impact of key determinants of labour and capital can be modelled using a frontier approach from which firm efficiency levels can be constructed. The approach can be deterministic, where all deviations from the frontier can be attributed to inefficiency, or stochastic, where it is possible to discriminate between random errors and differences in inefficiency.

The stochastic frontier model was originally proposed by Aigner, Lovell and Schmidt (1977), and extended to include the characteristics of the firm that explain inefficiency, following the work of Battese and Coelli (1995).

Alternatively, the identification of appropriate longitudinal panel data would allow the measurement of the dynamics of membership and the effect of the conditional variables over time. This research was reliant on the literature related to individual elements of the WC programme, allowing conclusions to be drawn on specific survey results obtained in a single questionnaire. The ability to follow a set of firms over time might become available when the next BEEPS survey is carried out, since there will be reliable panel data available, using similar questionnaires with identical methodology, thus resolving the problem encountered in this research.

The Washington Consensus programme has been a matter of controversial debate amongst scholars for the last thirty years. This research has added a unique approach by using firms treated with the full measure of the programme against a control group. Equally, it has raised a number of questions where the findings contradict claims made for its efficacy, for example, in relation to the failure to achieve an export multiplier and the lack of progress made by domestic firms. There is therefore much to pursue, using different databases to establish, with greater certainty, the overall influence of the Washington Consensus programme on the welfare of the New Member States.

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Appendices

Appendix 1

Summary statistics 2005 Full Sample

	Mean	St.Dev	min	max
Productivity	9.869	1.097	1.792	16.383
EU Membership	.367	.482	0	1
Export	9.005	22.704	0	100
Foreign Owner	8.649	25.787	0	100
Firm Age	17.871	62.272	4	2005
Bureaucracy	7.969	3.201	0	16
Firm Size	2.219	1.433	1	7
Infrastructure	5.366	2.155	0	12
Domestic Owner	1.941	.645	1	5
R&D	.319	.324	0	1
loan1	.428	.495	0	1

Summary statistics 2005 Manufacturing sample

	Mean	St.Dev	min	max
Productivity	9.767	1.077	3.045	13.148
EU Membership	.361	.48	0	1
Export	14.827	28.527	0	100
Foreign Owner	10.399	27.665	0	100
Firm Age	18.608	43.128	4	2005
Bureaucracy	8.438	3.279	0	16
Firm Size	2.491	1.511	1	7
Infrastructure	5.609	2.12	0	12
Domestic Owner	1.92	.705	1	5
R&D	.189	.324	0	1
loan1	.492	.5	0	1

Summary statistics 2005 Services sample

	Mean	St.Dev	min	max
Productivity	9.939	1.105	1.792	16.383
EU Membership	.371	.483	0	1
Export	4.963	16.39	0	100
Foreign Owner	7.437	24.33	0	100
Firm Age	17.36	72.64	4	2005
Bureaucracy	7.644	3.105	0	16
Firm Size	2.032	1.345	1	7
Infrastructure	5.197	2.164	0	12
Domestic Owner	1.957	.597	1	5
R&D	.072	.251	0	1
loan1	.384	.486	0	1

Summary statistics 2013 Full sample

	Mean	St.Dev	min	max
Productivity	10.486	2.029	.367	24.635
EU Membership	.274	.446	0	1
Export	8.381	22.595	0	100
Foreign Owner	5.44	20.902	0	100
Firm Age	34.619	200.181	1	2013
Bureaucracy	2.693	2.862	0	16
Firm Size	1.579	.718	0	7
Infrastructure	2.514	3.018	0	12
Domestic Owner	1.996	.63	1	6
R&D	.108	.311	0	1
loan1	.352	.478	0	1

Summary statistics 2013 manufacturing sample

	Mean	St.Dev	min	max
Productivity	10.217	1.906	2.992	22.048
EU Membership	.253	.435	0	1
Export	14.568	28.751	0	100
Foreign Owner	6.526	22.504	0	100
Firm Age	38.854	214.142	1	2013
Bureaucracy	2.695	2.829	0	16
Firm Size	1.696	.746	0	7
Infrastructure	2.555	3.029	0	12
Domestic Owner	1.993	.732	1	6
R&D	.154	.361	0	1
loan1	.368	.482	0	1

Summary statistics 2013 services sample

	Mean	St.Dev	min	max
Productivity	10.658	2.086	.367	24.635
EU Membership	.287	.452	0	1
Export	4.437	16.407	0	100
Foreign Owner	4.75	19.786	0	100
Firm Age	31.919	190.715	1	2013
Bureaucracy	2.692	2.884	0	16
Firm Size	1.505	.689	0	7
Infrastructure	2.488	3.011	0	12
Domestic Owner	1.999	.554	1	6
R&D	.079	.270	0	1
loan1	.342	.474	0	1

Pairwise Correlations 2005

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Productivity	1.000										
(2) EU Membership	0.531	1.000									
(3) Export	0.097	0.064	1.000								
(4) Foreign Owner	0.091	0.006	0.293	1.000							
(5) Firm Age	0.028	0.036	0.027	-0.020	1.000						
(6) Bureaucracy	0.035	0.022	0.086	0.052	-0.008	1.000					
(7) Firm Size	-0.023	-0.064	0.278	0.192	0.117	0.046	1.000				
(8) Infrastructure	-0.030	-0.030	-0.024	-0.061	-0.004	0.459	-0.054	1.000			
(9) Domestic Owner	0.086	0.069	0.040	0.180	-0.063	0.051	-0.121	0.009	1.000		
(10) R&D	0.187	0.090	0.256	0.037	0.116	-0.072	0.241	-0.022	-0.091	1.000	
(11) loan1	0.153	0.017	0.106	0.019	0.011	0.095	0.222	0.055	-0.022	0.008	1.000

Pairwise Correlations 2013

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Productivity	1.000										
(2) EU Membership	0.117	1.000									
(3) Export	0.046	0.201	1.000								
(4) Foreign Owner	0.101	0.129	0.208	1.000							
(5) Firm Age	-0.016	0.028	0.024	0.009	1.000						
(6) Bureaucracy	0.055	0.151	0.091	0.027	0.008	1.000					
(7) Firm Size	0.060	-0.068	0.147	0.136	0.034	0.039	1.000				
(8) Infrastructure	0.028	0.007	0.015	0.014	-0.007	0.378	0.046	1.000			
(9) Domestic Owner	0.166	-0.003	0.011	0.097	-0.001	-0.007	0.018	-0.003	1.000		
(10) R&D	-0.081	-0.068	-0.137	-0.067	-0.002	-0.141	-0.107	-0.094	-0.023	1.000	
(11) loan1	0.122	0.126	0.103	-0.002	0.001	0.129	0.119	0.062	-0.009	-0.108	1.000

Appendix 2

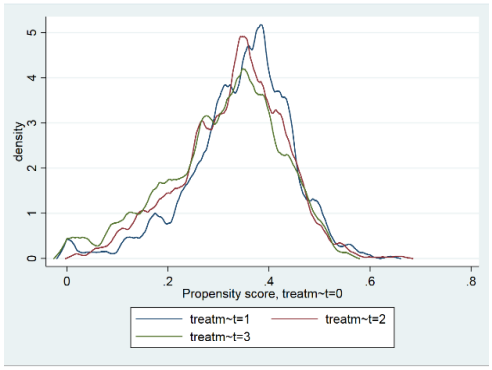
Estimated treatment and outcome models in the full sample (with treatment level 0 as the base category in the treatment model) (N=785)

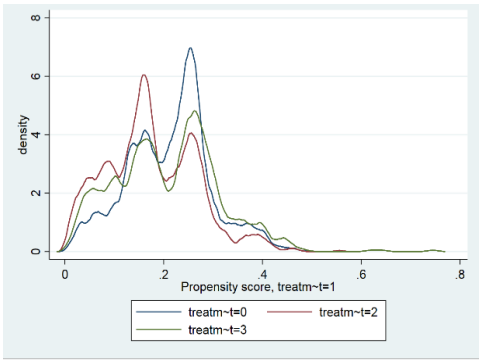
	Step 1. Treatment model			Step 2. outcome model			
VARIABLES	Treatment =1	Treatment =2	Treatment =3	Potential -outcome model for treatment =0	Potential -outcome model for treatment=1	Potential -outcome model for treatment=2	Potential -outcome model for treatment
export	-0.001	-0.002	-0.002	-0.002	0.012**	0.009	0.019***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.005)
Foreign Owned	0.007**	0.008***	0.007**	0.004	-0.005	-0.005	0.002
	(0.003)	(0.003)	(0.003)	(0.002)	(0.005)	(0.005)	(0.005)
Firm Age	0.011***	-0.001	0.007***	0.004**	0.007	0.006	0.005
	(0.003)	(0.002)	(0.002)	(0.002)	(0.006)	(0.005)	(0.005)
Bureaucracy	-0.018	-0.019	-0.040*	0.011	0.058	-0.002	0.064
	(0.036)	(0.021)	(0.021)	(0.016)	(0.044)	(0.039)	(0.042)
Firm Size	-0.213***	0.024	-0.099***	-0.090**	-0.178*	0.159**	0.129
	(0.049)	(0.037)	(0.038)	(0.036)	(0.100)	(0.073)	(0.080)
Infrastructure	0.034	-0.035	0.044	-0.005	-0.102	0.025	-0.092
	(0.051)	(0.027)	(0.030)	(0.024)	(0.079)	(0.059)	(0.064)
Domestic Firms	-0.001	0.005**	0.001	0.001	-0.007*	0.005	0.009**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
R & D	0.003***	0.001***	0.001***	0.000***	0.001	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Low-tech	0.013	-0.383**	0.216	0.018	0.128	1.374***	1.089**
	(0.220)	(0.190)	(0.253)	(0.205)	(0.424)	(0.368)	(0.437)
Mid-tech	0.460*	-0.080	0.082	0.004	1.196***	0.811**	1.417***
	(0.249)	(0.154)	(0.252)	(0.204)	(0.391)	(0.387)	(0.438)
High-tech	0.725**	0.295*	0.102	0.232	0.545	0.693	0.101
	(0.347)	(0.166)	(0.325)	(0.226)	(0.482)	(0.457)	(0.557)
Service 3	0.495**	-0.565***	0.395	0.077	-0.071	0.468	0.190
	(0.206)	(0.191)	(0.309)	(0.269)	(0.458)	(0.400)	(0.483)
Service 4	0.562**	-0.496*	0.166	0.229	0.335	0.082	1.004**
	(0.226)	(0.291)	(0.300)	(0.232)	(0.514)	(0.457)	(0.493)
Service 2	0.314	0.046	0.911***	-0.453	-0.270	-0.461	0.812
	(0.381)	(0.372)	(0.246)	(0.310)	(0.666)	(0.569)	(0.543)
Constant	9.498***	10.773***	9.745***	10.921***	0.001	-1.491***	-2.335***
	(0.367)	(0.226)	(0.317)	(0.367)	(0.602)	(0.520)	(0.588)

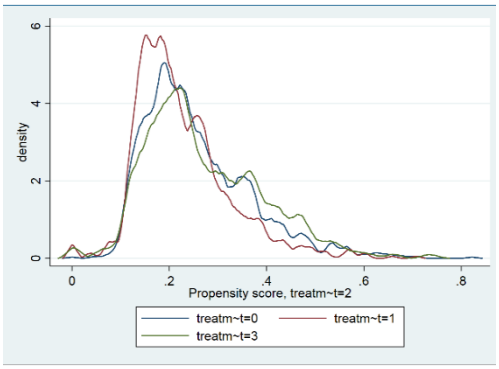
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.

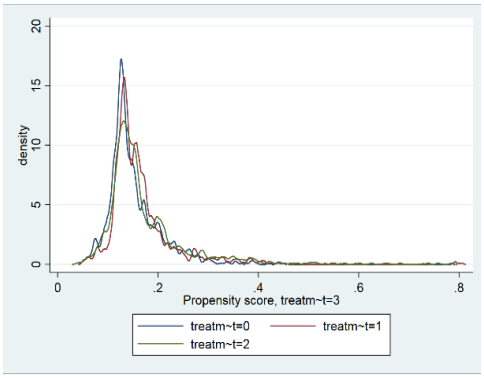
Appendix 3

1.1 Loans Full Sample 2005

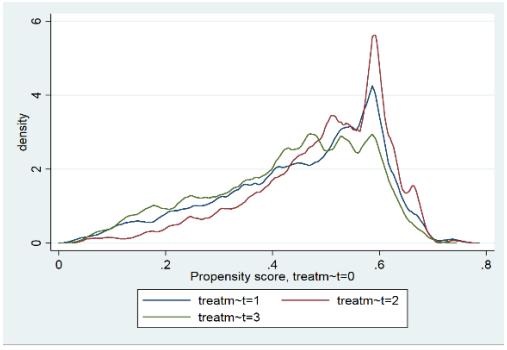


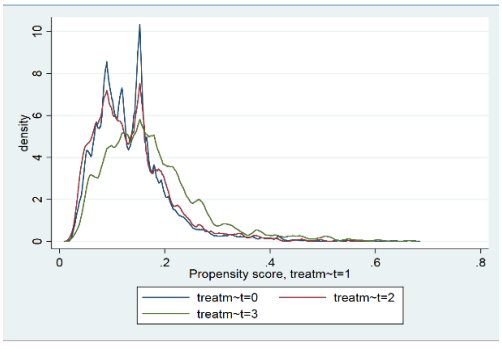


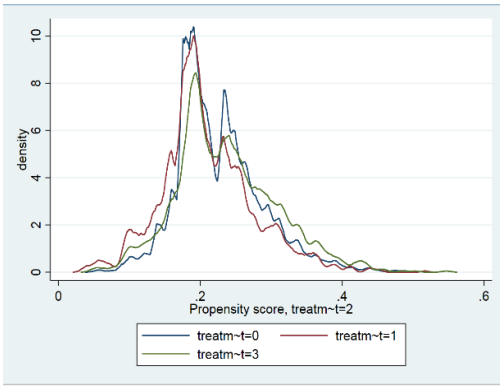


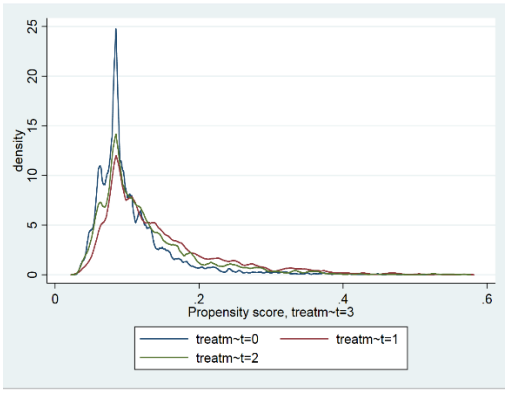


1.2 Loans Full Sample 2013

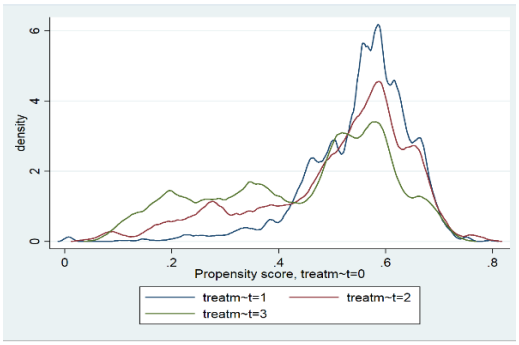


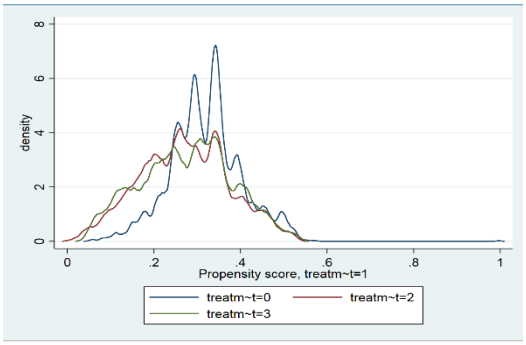


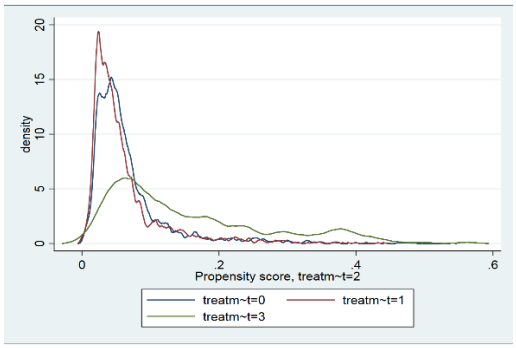


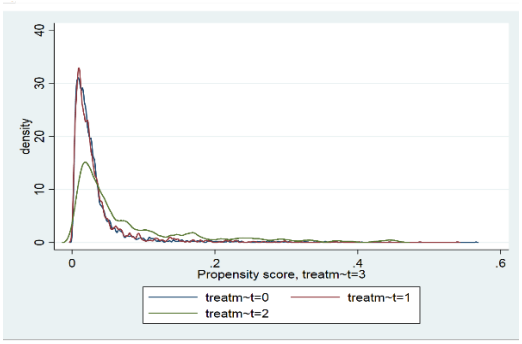


1.3 Foreign Ownership Full Sample 2005

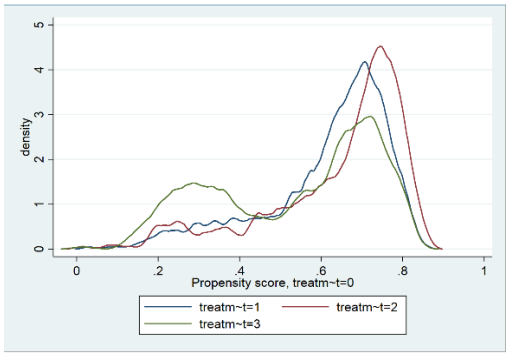


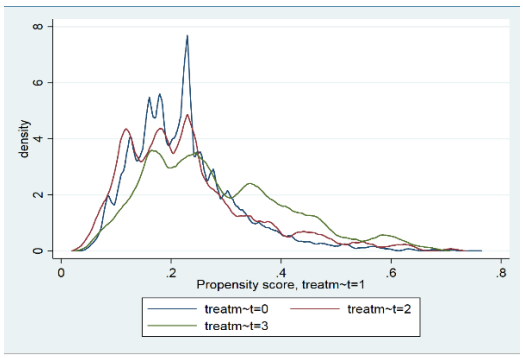


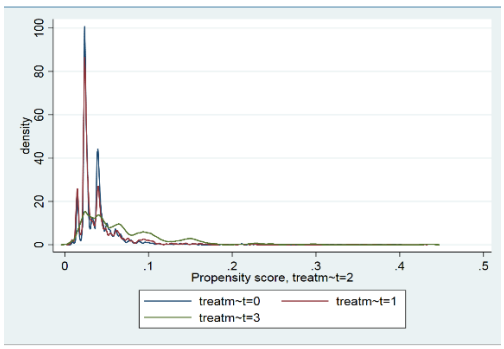


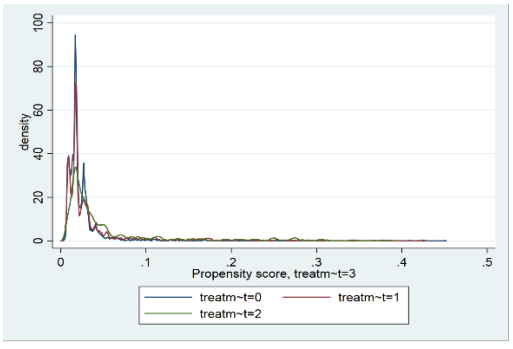


1.4 Foreign Ownership Full Sample 2013

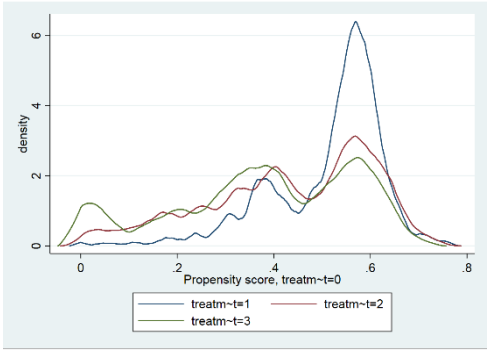


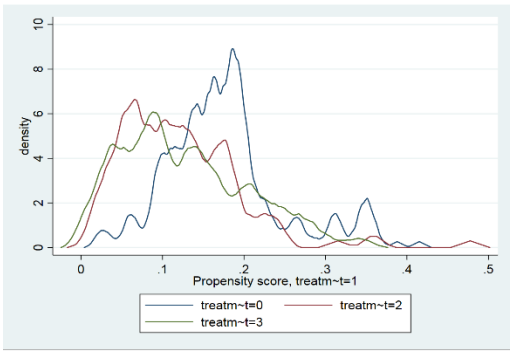


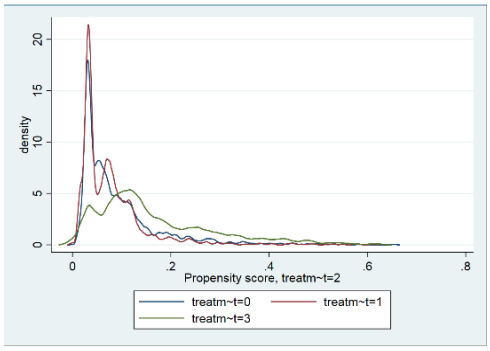


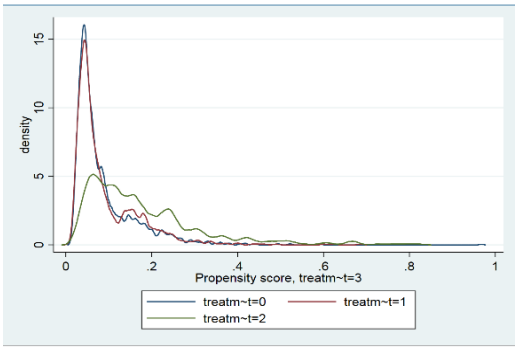


1.5 Exports Full Sample 2005

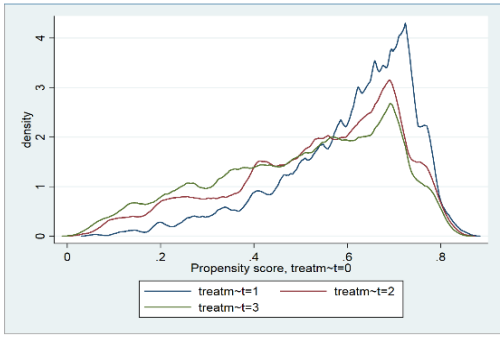


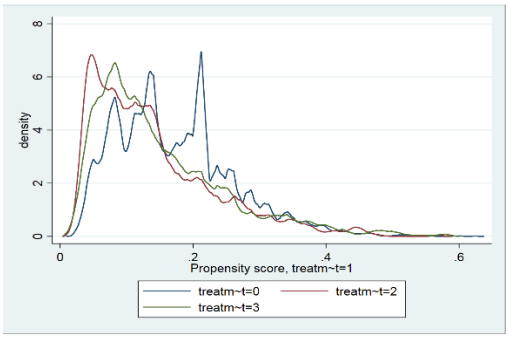


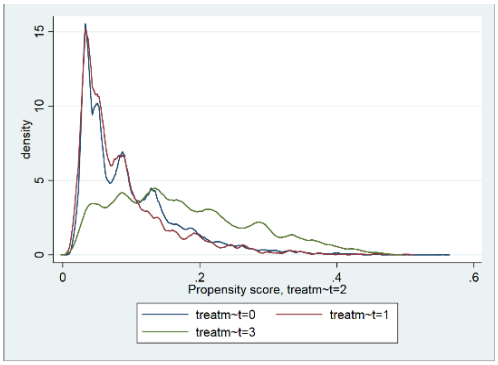


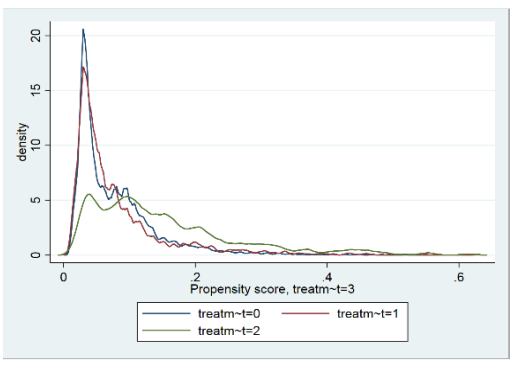


1.6 Exports Full Sample 2013

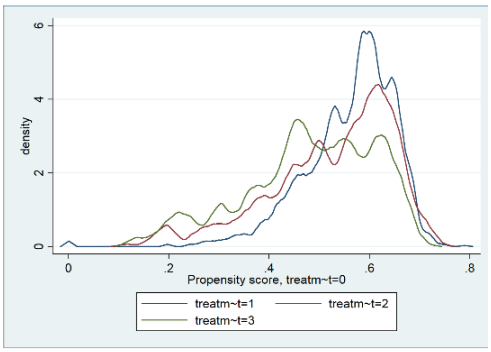


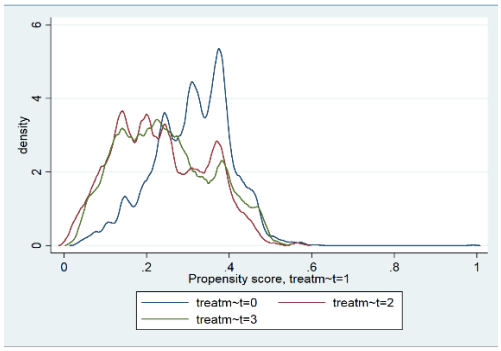


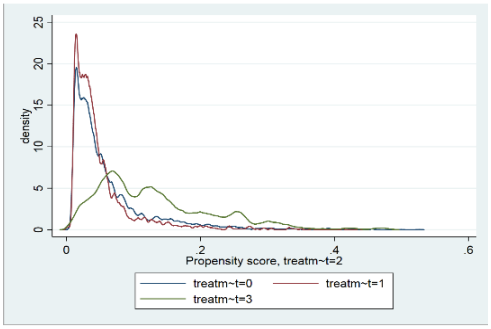


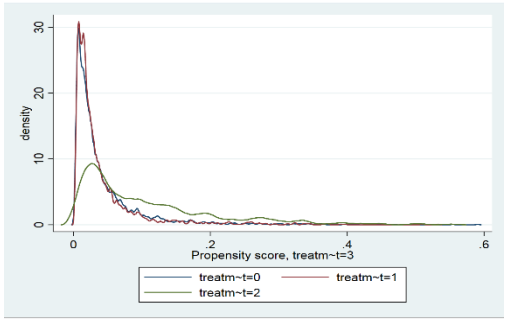


1.7 Research and Development Full Sample 2005

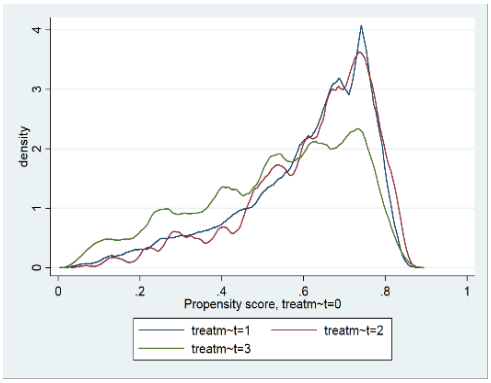


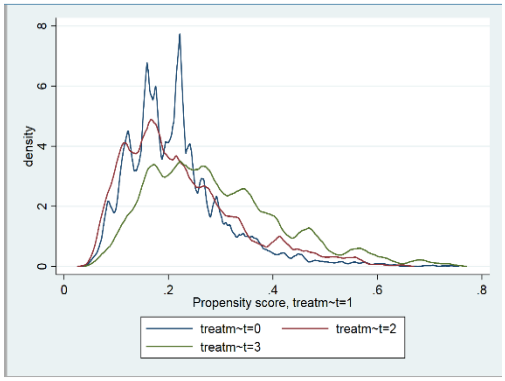


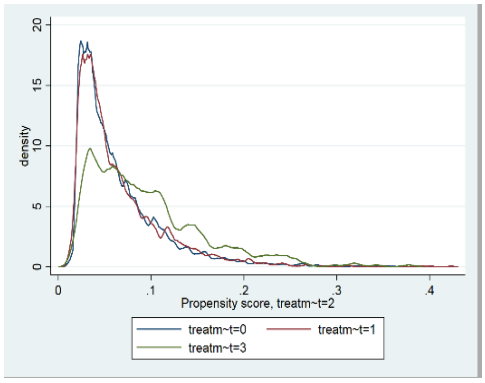


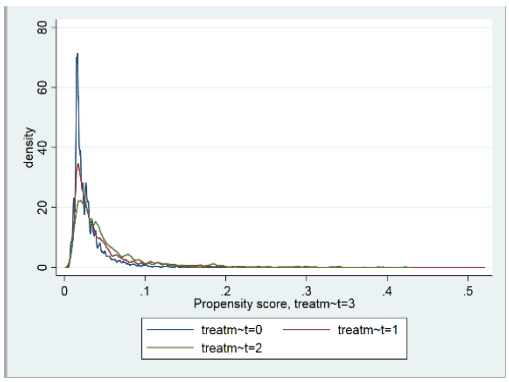


1.8 Research and Development Full Sample 2013

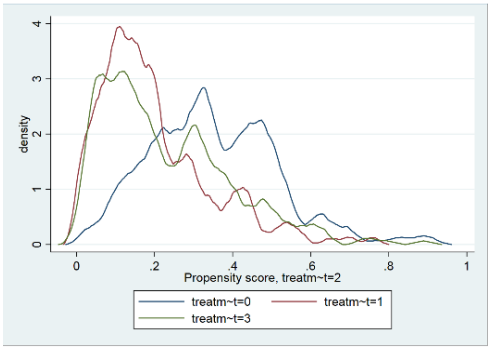


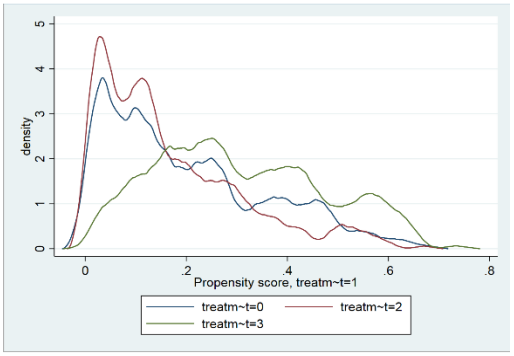


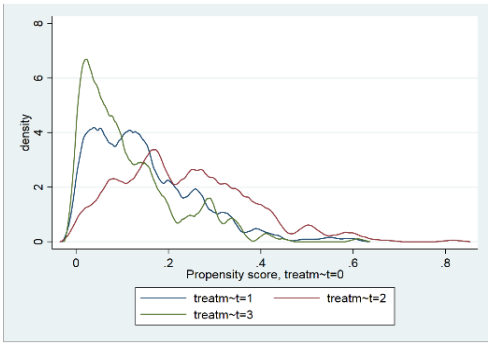


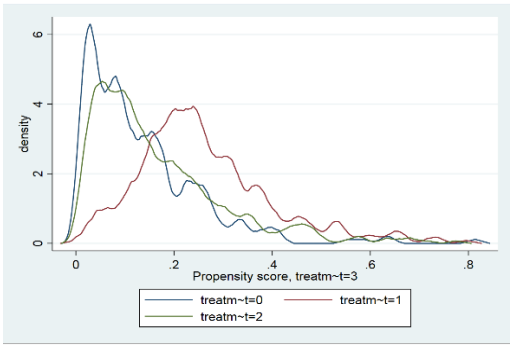


1.9 Loans Manufacturing Sample 2005

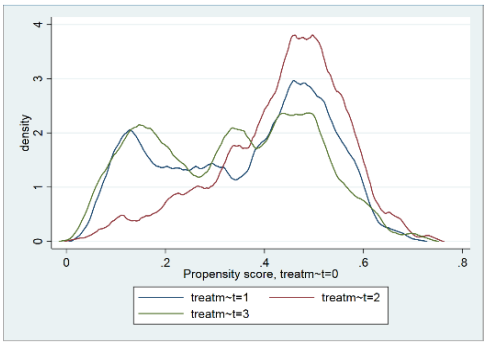


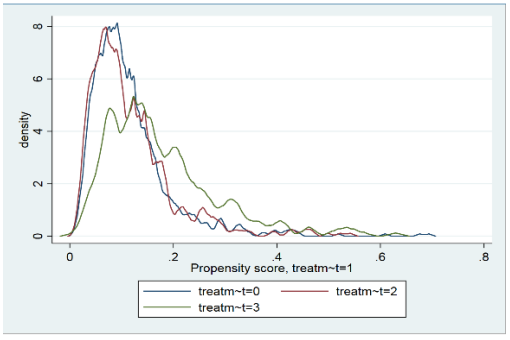


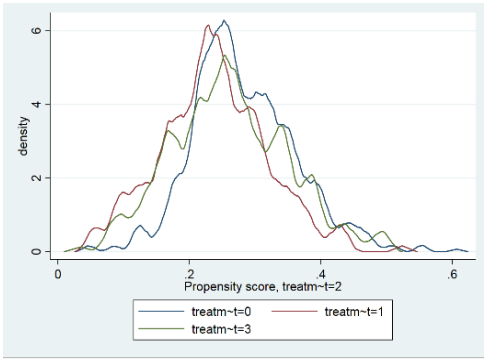


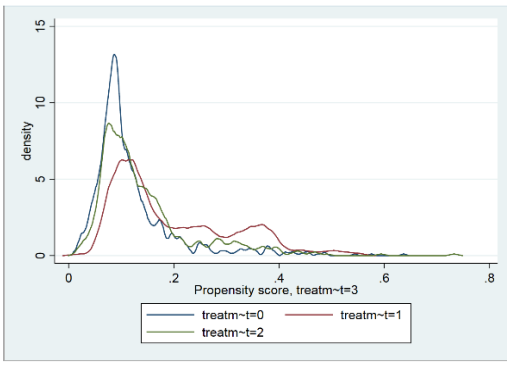


1.10 Loans Manufacturing Sample 2013

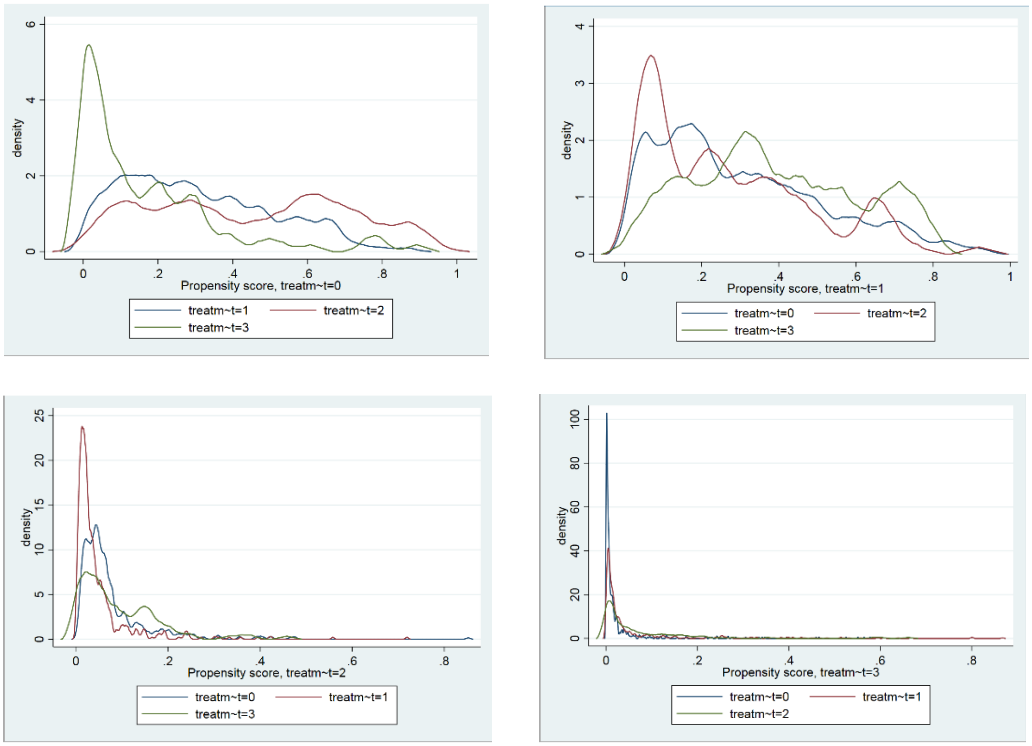




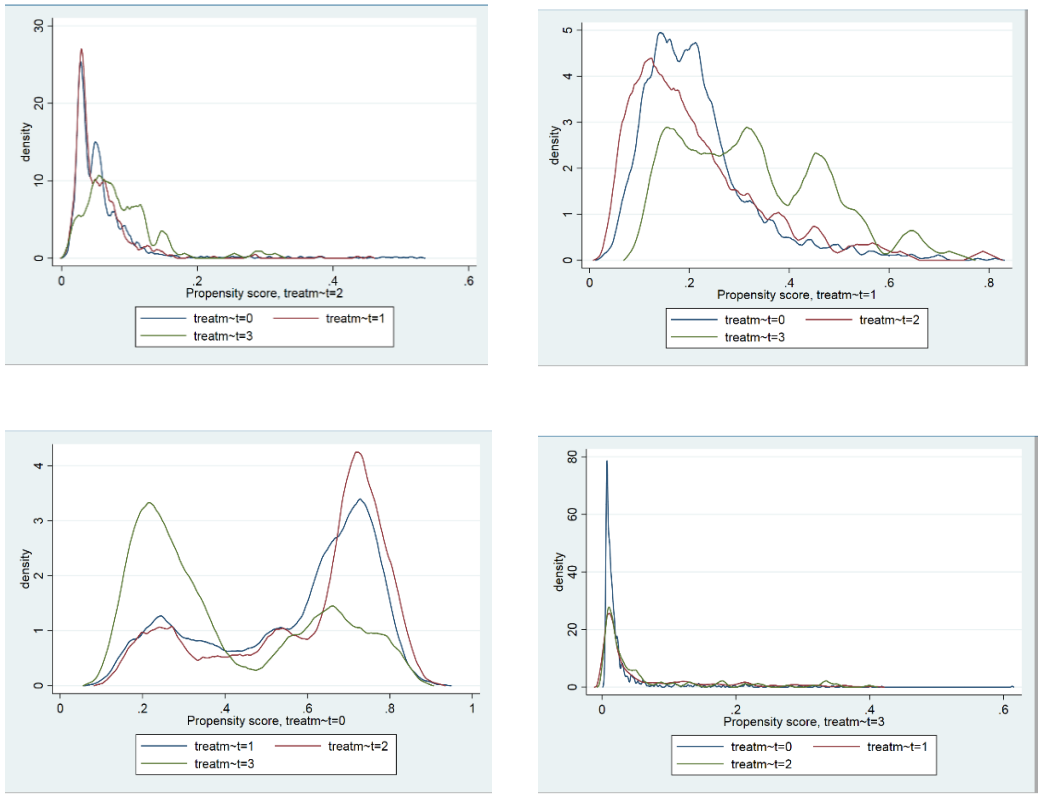




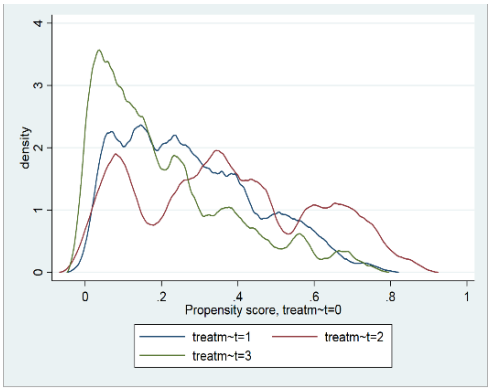
1.11 Foreign Ownership Manufacturing Sample 2005

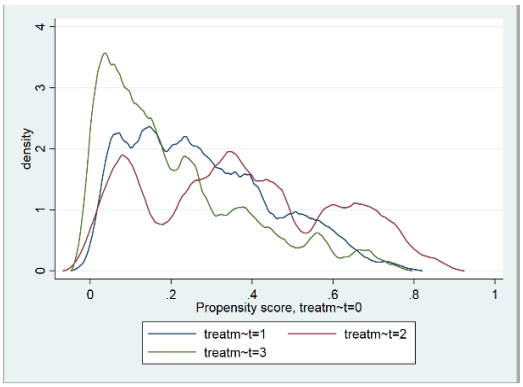


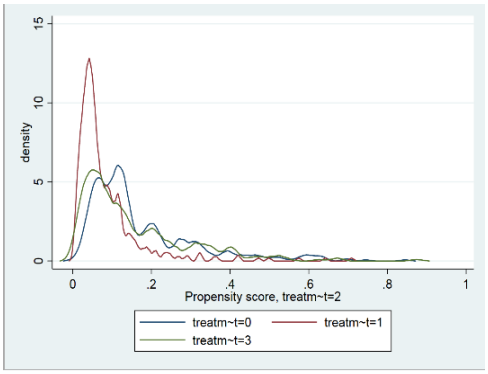
1.12 Foreign Ownership Manufacturing Sample

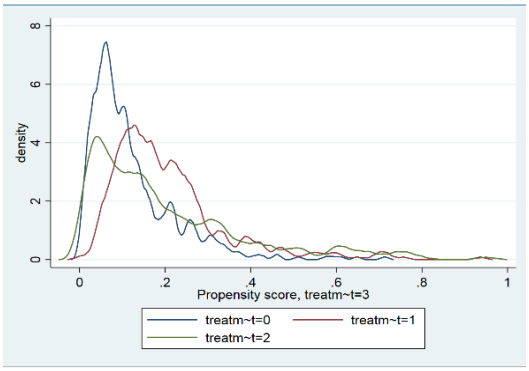


1.13 Exports Manufacturing Sample 2005

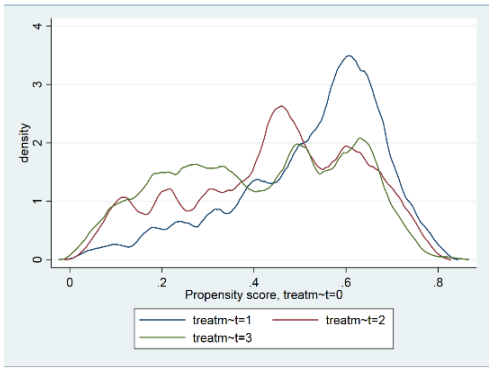


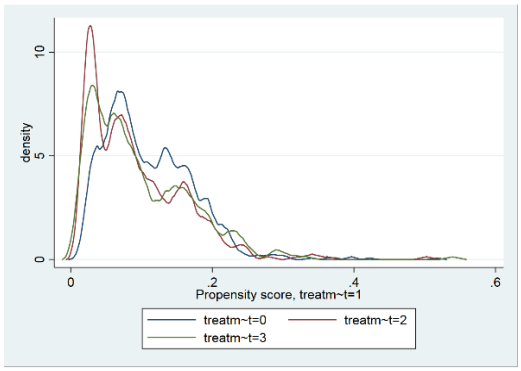


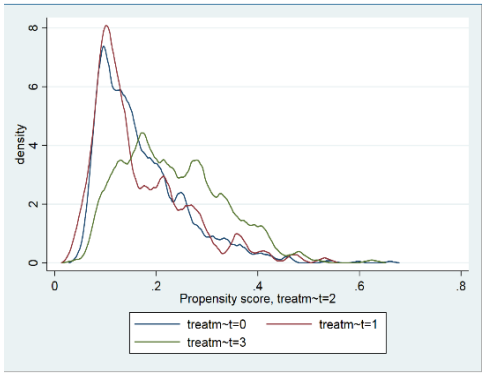


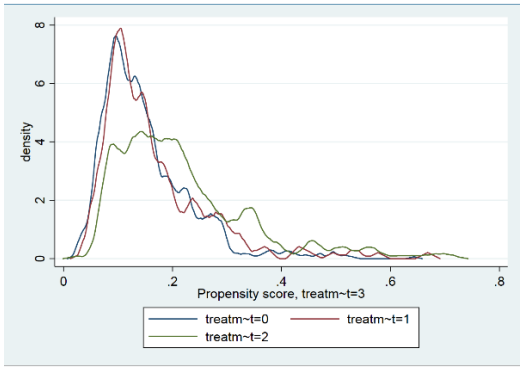


1.14 Export Manufacturing Sample 2013

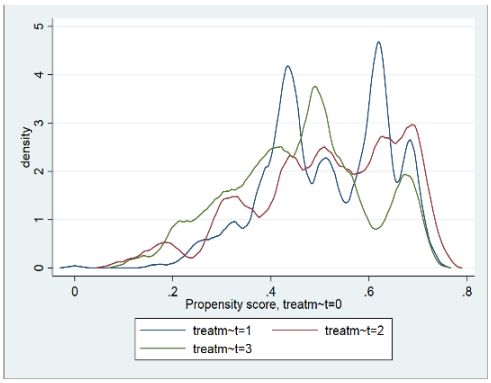


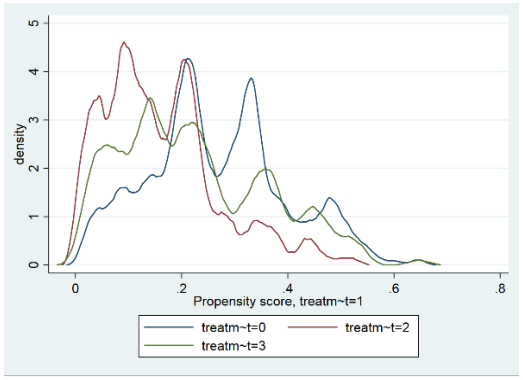


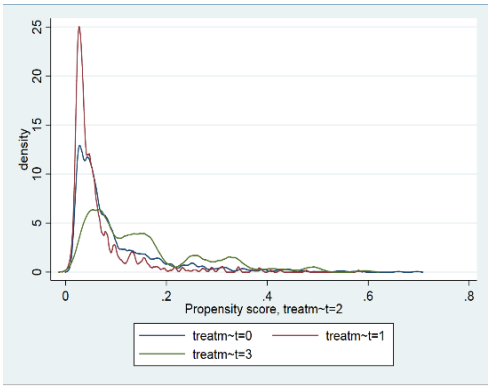


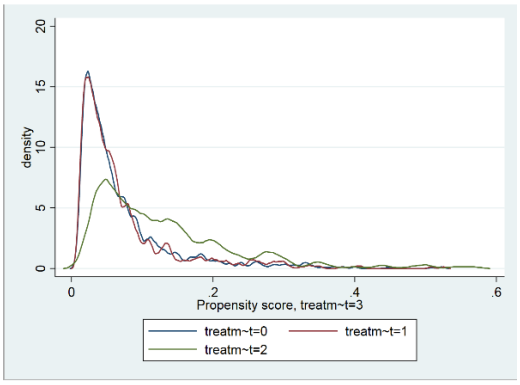


1.15 Research and Development Manufacturing Sample 2005

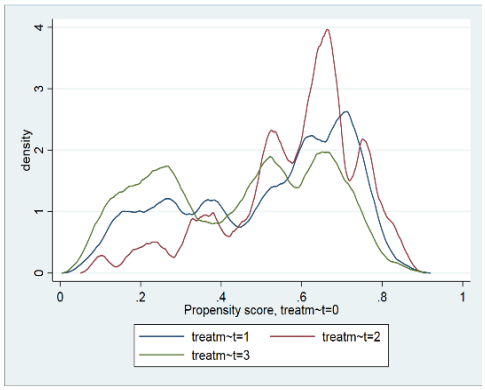


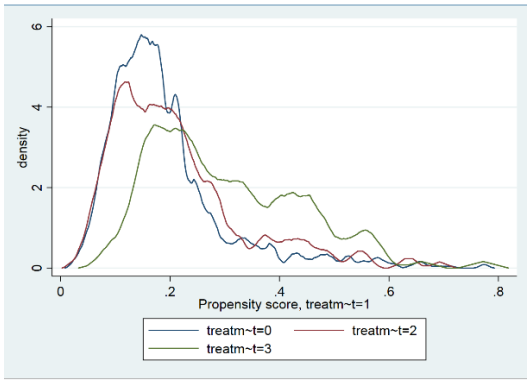


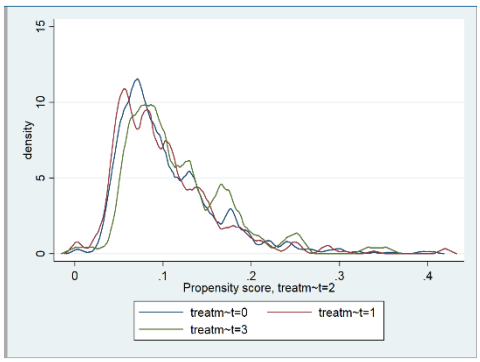


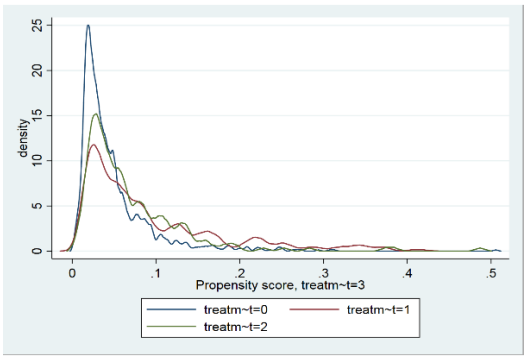


1.16 Research and Development Manufacturing Sample 2013

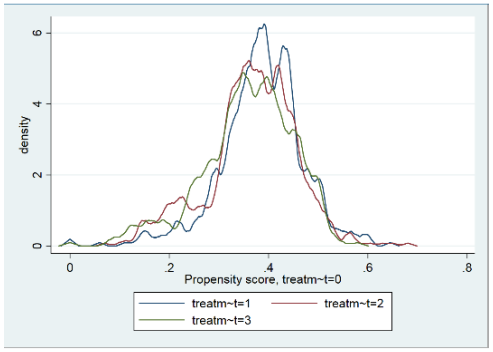


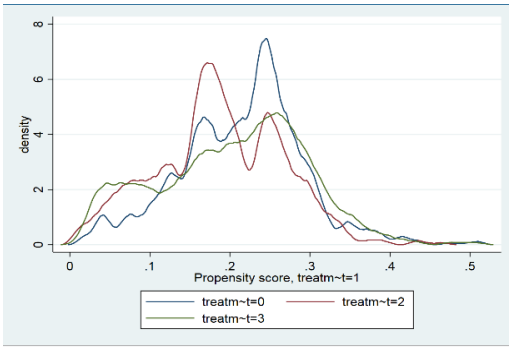


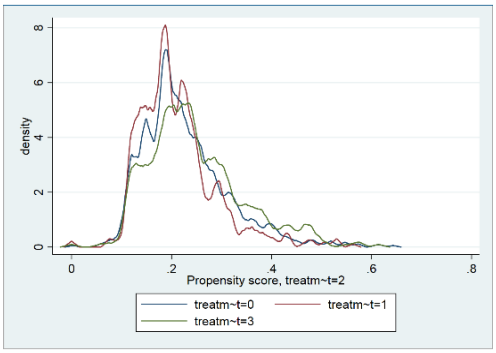


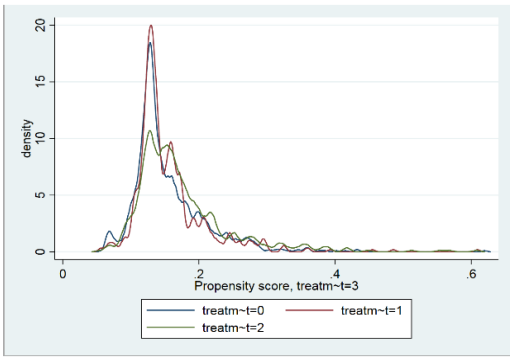


1.17 Loans Services Sample 2005

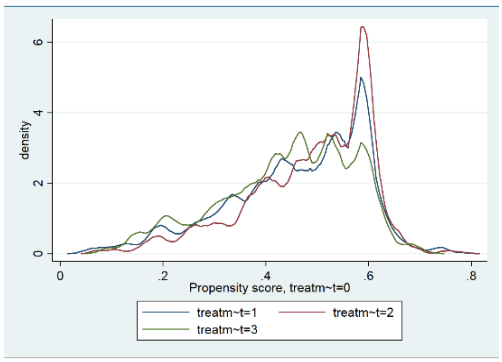


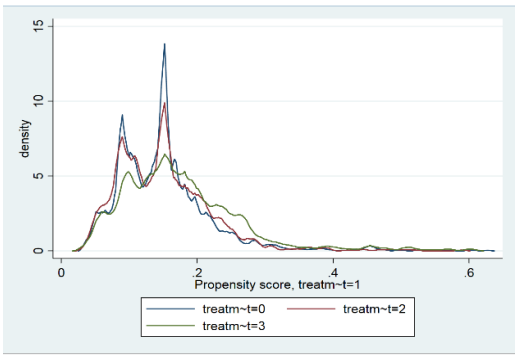


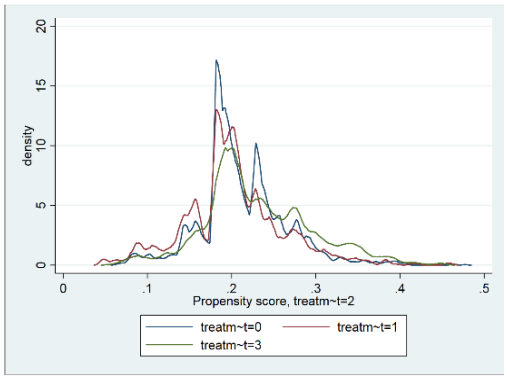


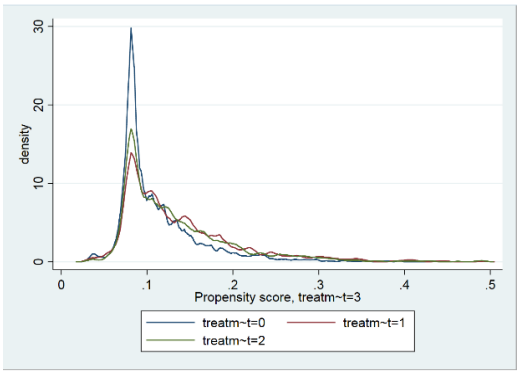


1.18 Loans Service Sample 2013

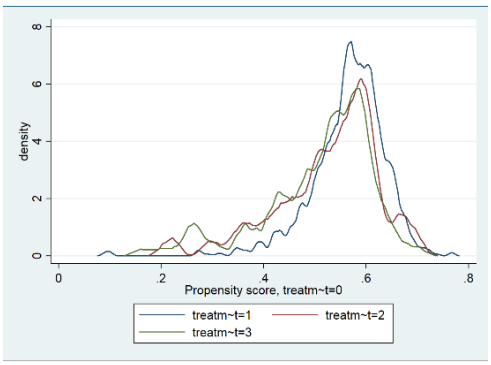


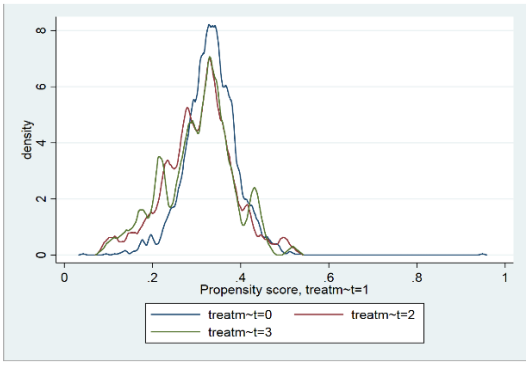


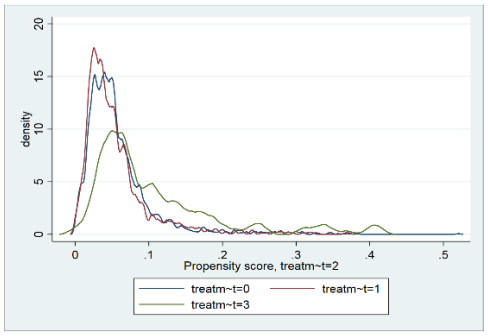


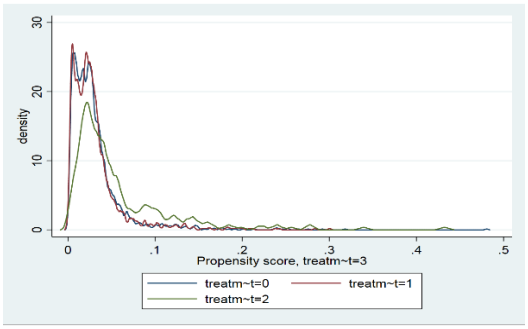


1.19 Foreign Ownership Services Sample 2005

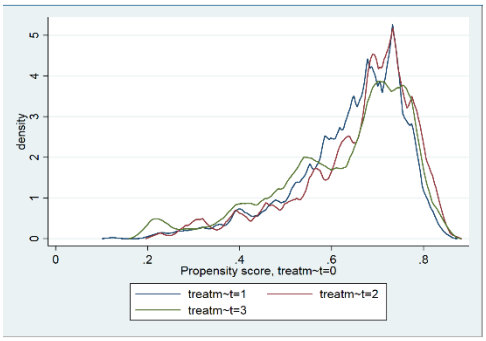


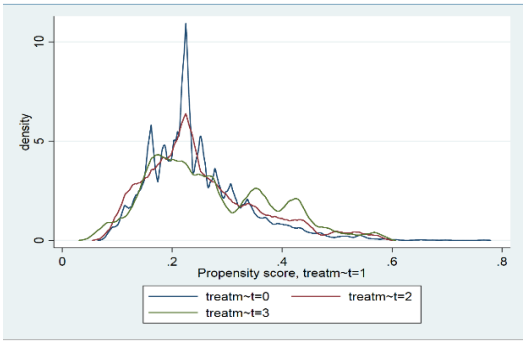


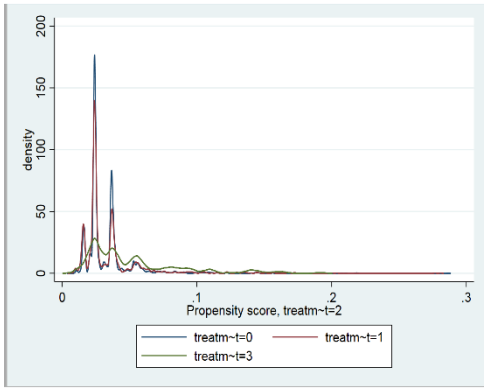


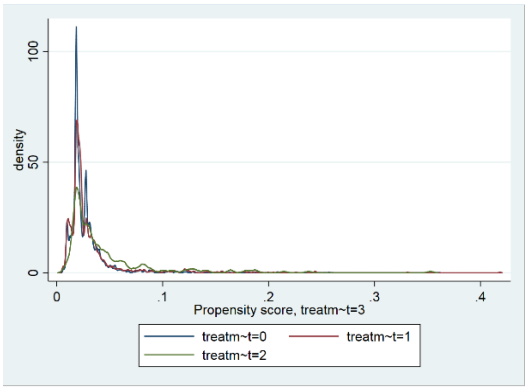


1.20 Foreign Ownership Services Sample 20013

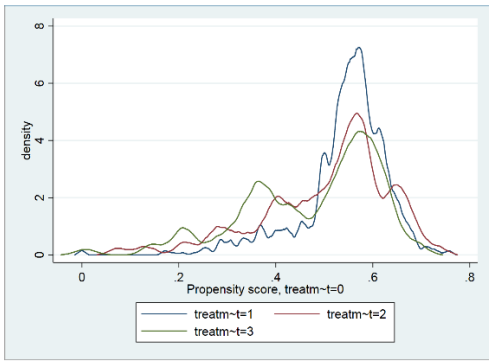


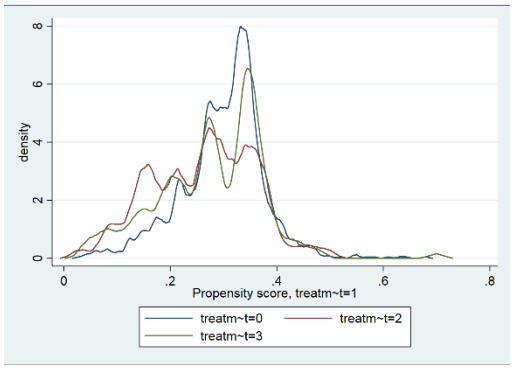


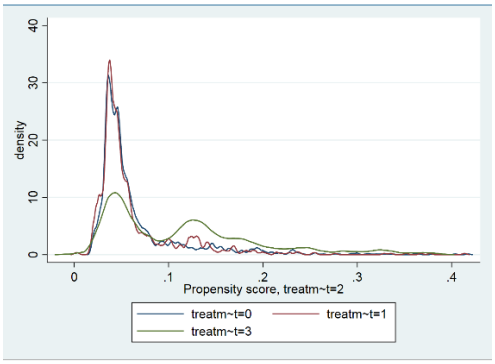


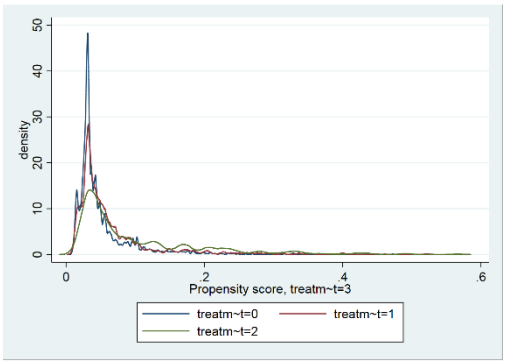


1.21 Export Services Sample 2005

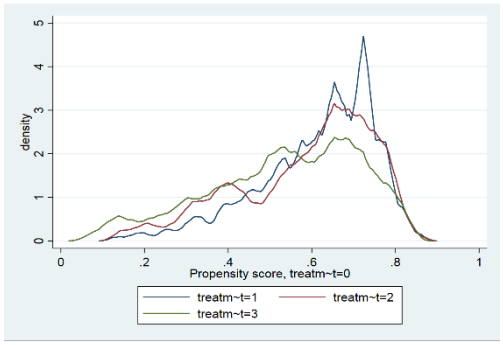


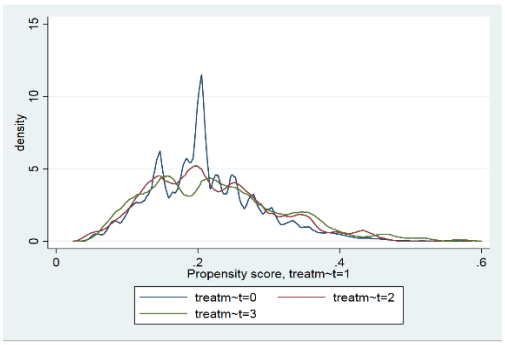


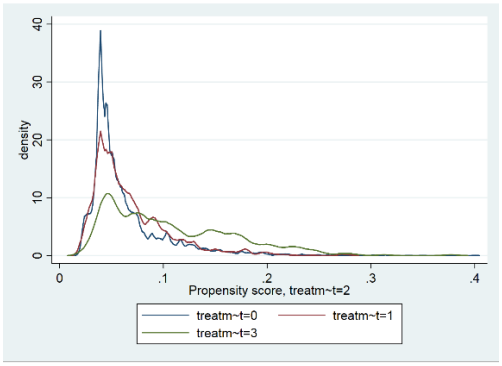


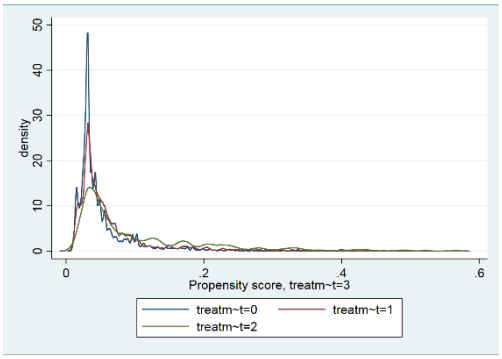


1.22 Export Services Sample 2013

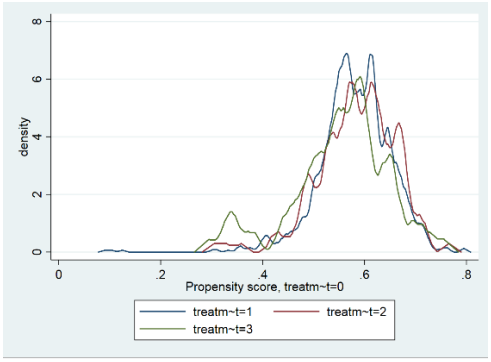


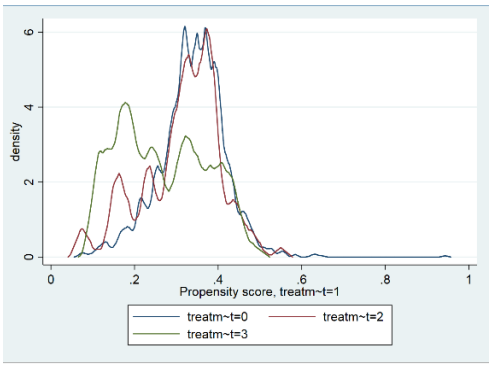


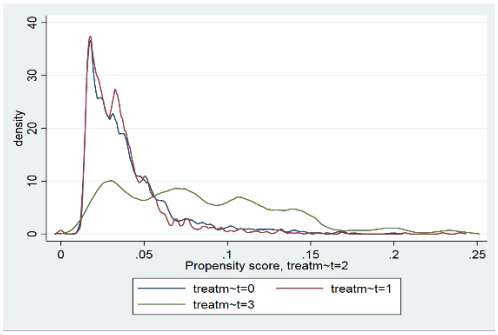


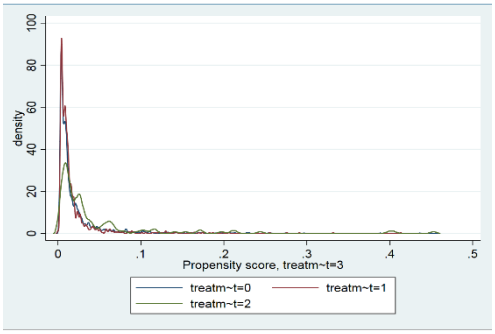


1.23 Research and Development Services Sample 2005

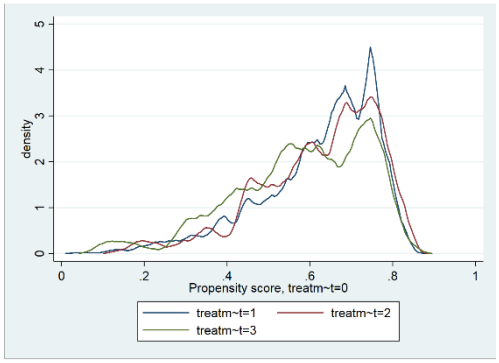


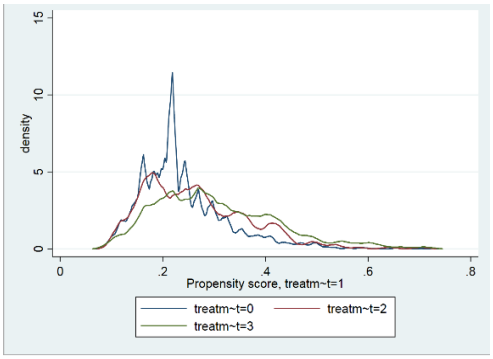


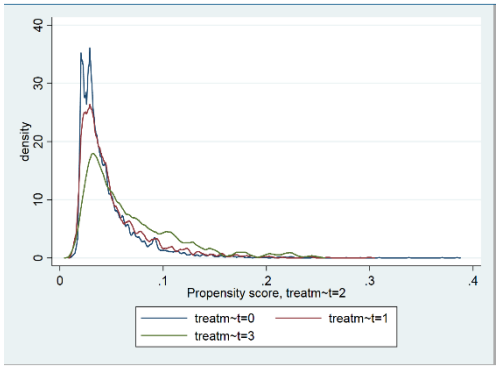


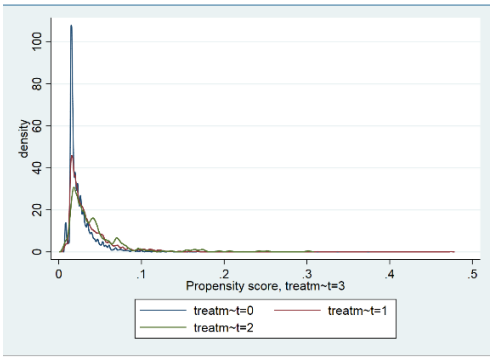


1.24 Research and Development Services Sample 2013









Appendix 4

Appendix 4a Absolute Effects of EU Membership and Loans

Absolute effects						
Loans – Full Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
Columns	**1**	**2**	**3**	**4**	**5**	**6**
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	1.035*** (0.046)	0.493*** (0.055)	0.380*** (0.040)	0.482*** (0.053)	1.378*** (0.047)	0.740*** (0.063)
ATT (in percentages) Output	0.109*** (0.005)	0.048*** (0.006)	0.041*** (0.004)	0.047*** (0.005)	0.146*** (0.005)	0.072*** (0.006)
Loans – Manufacturing Sample						
ATT Output	0.274*** (0.102)	0.345** (0.144)	0.140* (0.078)	0.213** (0.107)	0.675*** (0.092)	0.212 (0.153)
ATT (in percentages) Output	0.027*** (0.010)	0.034** (0.014)	0.015* (0.008)	0.021** (0.011)	0.067*** (0.010)	0.020 (0.014)
Loans – Services Sample						
ATT Output	1.042*** (0. .051)	0.437*** (0.067)	0.370*** (0.055)	0.468*** (0.069)	1.427*** (0.055)	0.723*** (0.073)
ATT (in percentages) Output	0.109*** (0.006)	0.042*** (0.007)	0.039*** (0.006)	0.045*** (0.006)	0.151*** (0.006)	0.069*** (0.007)

Appendix 4b Absolute Effects of EU Membership and Foreign Ownership

Absolute effects						
Foreign Ownership – Full Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
Columns	**1**	**2**	**3**	**4**	**5**	**6**
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	1.170*** (0.023)	0.439*** (0.043)	0.232*** (0.056)	0.293** (0.146)	1.478*** (0.062)	0.640*** (0.126)
ATT (in percentages) Output	0.124*** (0.003)	0.042*** (0.004)	0.025*** (0.006)	0.027** (0.014)	0.156*** (0.006)	0.060*** (0.012)
Foreign Ownership – Manufacturing Sample						
ATT Output	0.391*** (0.052)	0.243** (0.108)	-0.067 (0.098)	-0.093 (0.216)	0.397*** (0.131)	0.205 (0.291)
ATT (in percentages) Output	0.039*** (0.005)	0.023** (0.011)	-0.007 (0.010)	-0.009 (0.020)	0.038*** (0.013)	0.091 (0.027)
Foreign Ownership – Services						
ATT Output	1.153*** (0.029)	0.357*** (0.052)	0.249*** (0.082)	0.202 (0.198)	1.481*** (0.084)	0.069*** (0.014)
ATT (in percentages) Output	0.122*** (0.045)	0.034*** (0.005)	0.026*** (0.009)	0.019 (0.018)	0.156*** (0.009)	0.065*** (0.014)

Appendix 4c Absolute Effects of EU Membership and Exports

Absolute effects						
Exports – Full Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
Columns	**1**	**2**	**3**	**4**	**5**	**6**
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	1.098*** (0.035)	0.452*** (0.045)	0.464*** (0.056)	0.591*** (0.084)	1.312*** (0.057)	0.724*** (0.063)
ATT (in percentages) Output	0.116*** (0.004)	0.044*** (0.004)	0.050*** (0.006)	0.057*** (0.008)	0.138*** (0.007)	0.070*** (0.006)
Exports – Manufacturing Sample						
ATT Output	0.426*** (0.065)	0.364*** (0.121)	0.188*** (0.068)	0.390*** (0.128)	0.345** (0.133)	0.519*** (0.115)
ATT (in percentages) Output	0.042*** (0.007)	0.036*** (0.012)	0.020*** (0.007)	0.038*** (0.012)	0.033** (0.013)	0.050*** (0.012)
Exports – Services Sample						
ATT Output	1.077*** (0.042)	0.367*** (0.053)	0.789*** (0.085)	0.736*** (0.140)	1.564*** (0.099)	0.787*** (0.105)
ATT (in percentages) Output	0.113*** (0.005)	0.035*** (0.005)	0.083*** (0.009)	0.070*** (0.013)	0.165*** (0.012)	0.074*** (0.010)

Appendix 4d Absolute Effects of EU Membership and Research and Development

Absolute effects						
Research and Development – Full Sample						
	1 vs 0		**2 vs 0**		**3 vs 0**	
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	1.167*** (0.024)	0.472*** (0.046)	0.404*** (0.055)	0.591*** (0.084)	1.567*** (0.057)	0.824*** (0.086)
ATT (in percentages) Output	0.124*** (0.003)	0.046*** (0.005)	0.043*** (0.006)	0.057*** (0.008)	0.168*** (0.007)	0.080*** (0.009)
Research and Development – Manufacturing Sample						
ATT Output	1.166*** (0.041)	0.344*** (0.114)	0.440*** (0.073)	0.265** (0.133)	1.664*** (0.069)	0.299 (0.208)
ATT (in percentages) Output	0.125*** (0.005)	0.034*** (0.011)	0.046*** (0.008)	0.025** (0.0.013)	0.179*** (0.008)	0.028 (0.020)
Research and Development – Services Sample						
ATT Output	1.157*** (0.031)	0.387*** (0.056)	0.270*** (0.088)	0.559*** (0.135)	1.384*** (0.107)	0.812*** (0.122)
ATT (in percentages) Output	0.121*** (0.004)	0.037*** (0.005)	0.028*** (0.009)	0.053*** (0.013)	0.146*** (0.012)	0.077*** (0.012)

Appendix 4e Relative Effects of EU Membership and Loans

Relative effects						
Loans – Full Sample						
	1 vs 2		**3 vs 2**		**3 vs 1**	
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	0.681*** (0.061)	0.009 (0.075)	1.007*** (0.049)	0.271*** (0.066)	0.245*** (0.035)	0.292*** (0.056)
ATT (in percentages) Output	0.069*** (0.007)	0.001 (0.007)	0.103*** (0.005)	0.025*** (0.006)	0.023*** (0.003)	0.027*** (0.005)
Loans – Manufacturing Sample						
ATT Output	0.377*** (0.069)	0.165 (0.127)	0.484*** (0.069)	0.227* (0.130)	0.129*** (0.048)	0.249** (0.111)
ATT (in percentages) Output	0.037*** (0.007)	0.016 (0.012)	0.047*** (0.007)	0.021* (0.012)	0.012*** (0.005)	0.024** (0.011)
Loans Services Sample						
ATT Output	0.634*** (0.101)	-0.097 (0.100)	0.981*** (0.074)	0.170* (0.088)	0.274*** (0.050)	0.282*** (0.073)
ATT (in percentages) Output	0.064*** (0.011)	-0.009 (0.009)	0.099*** (0.008)	0.015* (0.008)	0.026*** (0.005)	0.026*** (0.007)

Appendix 4f Relative Effects of EU Membership and Foreign Ownership

Relative effects						
Foreign Ownership – Full Sample						
	1 vs 2		**3 vs 2**		**3 vs 1**	
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	0.817*** (0.069)	0.190 (0.118)	1.288*** (0.080)	0.569*** (0.185)	0.216*** (0.059)	0.582*** (0.096)
ATT (in percentages) Output	0.084*** (0.008)	0.018 (0.011)	0.134*** (0.009)	0.053*** (0.018)	0.020*** (0.006)	0.054*** (0.009)
Foreign Ownership – Manufacturing Sample						
ATT Output	0.580*** (0.091)	0.106 (0.178)	1.000*** (0.236)	0.489* (0.274)	0.248** (1.000)	0.391** (0.170)
ATT (in percentages) Output	0.058*** (0.010)	0.010 (0.017)	0.101*** (0.026)	0.047* (0.027)	0.023** (0.009)	0.037** (0.016)
Foreign Ownership – Services Sample						
ATT Output	0.728*** (0.103)	0.169 (0.156)	1.134*** (0.116)	0.566** (0.253)	0.263*** (0.077)	0.667*** (0.126)
ATT (in percentages) Output	0.074*** (0.011)	0.016 (0.015)	0.116*** (0.013)	0.051** (0.024)	0.025*** (0.007)	0.061*** (0.012)

Appendix 4g Relative Effects of EU Membership and Exports

Relative effects						
Export – Full Sample						
	1 vs 2		**3 vs 2**		**3 vs 1**	
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	0.484*** (0.084)	-0.105 (0.110)	0.801*** (0.069)	0.184** (0.091)	0.254** (0.114)	0.241*** (0.079)
ATT (in percentages) Output	0.048*** (0.007)	-0.010 (0.010)	0.080*** (0.007)	0.017** (0.008)	0.024** (0.011)	0.022*** (0.007)
Export – Manufacturing Sample						
ATT Output	0.317*** (0.102)	0.039 (0.143)	0.444*** (0.078)	0.149 (0.131)	-0.056 (0.057)	0.482*** (0.176)
ATT (in percentages) Output	0.031*** (0.010)	0.004 (0.014)	0.043*** (0.008)	0.014 (0.012)	-0.005 (0.005)	0.047*** (0.018)
Export – Services Sample						
ATT Output	0.344*** (0.114)	-0.201 (0.137)	0.721*** (0.150)	0.110 (0.172)	0.445*** (0.061)	0.433*** (0.096)
ATT (in percentages) Output	0.034*** (0.012)	-0.018 (0.012)	0.071*** (0.146)	0.009 (0.015)	0.042*** (0.006)	0.040*** (0.009)

Appendix 4h Relative Effects of EU Membership and Research and Development

Relative effects						
Research and Development – Full Sample						
	1 vs 2		**3 vs 2**		**3 vs 1**	
	2005	**2013**	**2005**	**2013**	**2005**	**2013**
ATT Output	0.876*** (0.066)	-0.004 (0.104)	1.162*** (0.065)	0.218* (0.127)	0.290*** (0.061)	0.340*** (0.076)
ATT (in percentages) Output	0.090*** (0.007)	-0.000 (0.009)	0.120*** (0.007)	0.020* (0.012)	0.027*** (0.006)	0.031*** (0.007)
Research and Development – Manufacturing Sample						
ATT Output	0.660*** (0.120)	-0.358 (0.334)	1.209*** (0.083)	-0.237 (0.316)	0.349*** (0.073)	0.293** (0.122)
ATT (in percentages) Output	0.067*** (0.013)	-0.033 (0.030)	0.124*** (0.009)	-0.021 (0.028)	0.033*** (0.007)	0.027** (0.012)
Research and Development – Services Sample						
ATT Output	0.903*** (0.112)	-0.103 (0.148)	1.010*** (0.138)	0.271 (0.169)	0.236* (0.142)	0.433*** (0.114)
ATT (in percentages) Output	0.092*** (0.013)	-0.009 (0.013)	0.103*** (0.015)	0.024 (0.015)	0.022* (0.014)	0.040*** (0.010)

Appendix 5a QTE Table 1 Productivity Results – Full Sample – 2005

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.484***	1.259***	1.042***	0.901***	0.788***	0.704***	0.611***	0.492***	0.377***
	(0.046)	(0.046)	(0.047)	(0.042)	(0.038)	(0.037)	(0.038)	(0.039)	(0.044)
Age of Firm	0.158	0.073	0.143	0.242**	0.176	0.093	-0.015	-0.125***	-0.301***
	(0.125)	(0.129)	(0.222)	(0.121)	(0.112)	(0.094)	(0.080)	(0.045)	(0.027)
Size of Firm	-0.136	-0.061	-0.038	-0.041	-0.009	0.001	0.026	0.024	-0.002
	(0.135)	(0.053)	(0.058)	(0.062)	(0.062)	(0.051)	(0.031)	(0.027)	(0.020)
Foreign Owned	0.029	0.205***	0.302***	0.307***	0.363***	0.407***	0.443***	0.562***	0.672***
	(0.069)	(0.064)	(0.064)	(0.062)	(0.060)	(0.059)	(0.060)	(0.069)	(0.083)
Privately Owned	-0.083	0.046	0.085*	0.068	0.090**	0.108**	0.160***	0.221***	0.211***
	(0.051)	(0.044)	(0.047)	(0.046)	(0.044)	(0.042)	(0.042)	(0.045)	(0.059)
Export	0.002***	0.001	0.001**	0.002***	0.002***	0.002***	0.002**	0.002**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.278***	0.266***	0.313***	0.332***	0.315***	0.338***	0.342***	0.355***	0.313***
	(0.032)	(0.029)	(0.028)	(0.027)	(0.027)	(0.028)	(0.029)	(0.031)	(0.034)
GDP Growth	-0.010**	-0.026***	-0.041***	-0.054***	-0.064***	-0.073***	-0.077***	-0.080***	-0.076***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Inflation	-0.006**	-0.014***	-0.024***	-0.031***	-0.036***	-0.039***	-0.043***	-0.045***	-0.047***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Sector Dummy	-0.094***	-0.121***	-0.189***	-0.264***	-0.293***	-0.301***	-0.310***	-0.317***	-0.376***
	(0.033)	(0.029)	(0.028)	(0.027)	(0.027)	(0.028)	(0.029)	(0.031)	(0.034)
Constant	8.330***	8.852***	9.345***	9.808***	10.166***	10.477***	10.757***	11.057***	11.511***
	(0.081)	(0.079)	(0.089)	(0.081)	(0.072)	(0.069)	(0.068)	(0.071)	(0.090)
Observations	6,628	6,628	6,628	6,628	6,628	6,628	6,628	6,628	6,628

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5b QTE Productivity Results – Manufacturing Sample – 2005

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.408***	1.200***	0.970***	0.898***	0.798***	0.705***	0.549***	0.383***	0.332***
	(0.077)	(0.072)	(0.070)	(0.068)	(0.067)	(0.067)	(0.069)	(0.066)	(0.061)
Age of Firm	0.356	0.202	0.103	0.130	0.882	2.106	0.946	-0.332***	-0.507***
	(0.263)	(0.236)	(0.215)	(0.284)	(2.373)	(2.273)	(1.992)	(0.097)	(0.057)
Size of Firm	0.081*	0.103**	0.067	0.055	0.031	0.117	0.166**	0.140**	0.161
	(0.043)	(0.044)	(0.041)	(0.040)	(0.046)	(0.099)	(0.084)	(0.067)	(0.112)
Foreign Owned	-0.025	0.258**	0.107	0.129	0.175	0.359***	0.414***	0.475***	0.526***
	(0.113)	(0.107)	(0.099)	(0.098)	(0.114)	(0.113)	(0.117)	(0.106)	(0.123)
Privately Owned	-0.159*	0.052	-0.104	-0.099	-0.131	-0.013	0.040	0.050	0.021
	(0.088)	(0.095)	(0.083)	(0.078)	(0.090)	(0.088)	(0.091)	(0.079)	(0.101)
Export	-0.001	-0.001	-0.002**	-0.001	-0.001	-0.001	-0.001	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.252***	0.260***	0.311***	0.319***	0.312***	0.280***	0.229***	0.296***	0.245***
	(0.047)	(0.042)	(0.039)	(0.039)	(0.041)	(0.042)	(0.044)	(0.045)	(0.048)
GDP Growth	-0.013	-0.038***	-0.056***	-0.067***	-0.073***	-0.082***	-0.084***	-0.089***	-0.077***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Inflation	-0.020***	-0.023***	-0.033***	-0.036***	-0.041***	-0.048***	-0.052***	-0.063***	-0.056***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Constant	8.496***	8.898***	9.571***	9.867***	10.184***	10.429***	10.752***	11.194***	11.442***
	(0.134)	(0.145)	(0.137)	(0.127)	(0.150)	(0.151)	(0.156)	(0.118)	(0.129)
Observations	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5c QTE Productivity Results – Services Sample – 2005

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.530***	1.262***	1.066***	0.878***	0.774***	0.690***	0.628***	0.553***	0.389***
	(0.059)	(0.060)	(0.058)	(0.054)	(0.049)	(0.047)	(0.047)	(0.048)	(0.064)
Age of Firm	0.232*	0.092	0.008	0.218	0.132	0.078	-0.027	-0.150	-0.280***
	(0.139)	(0.174)	(0.169)	(0.143)	(0.130)	(0.112)	(0.097)	(0.143)	(0.033)
Size of Firm	-0.565***	-0.116	-0.110	-0.085	-0.094*	-0.115**	-0.140**	-0.062	-0.111***
	(0.106)	(0.079)	(0.072)	(0.057)	(0.056)	(0.055)	(0.057)	(0.050)	(0.036)
Foreign Owned	0.026	0.238***	0.379***	0.363***	0.403***	0.455***	0.496***	0.638***	0.635***
	(0.094)	(0.086)	(0.081)	(0.079)	(0.077)	(0.078)	(0.081)	(0.088)	(0.105)
Privately Owned	-0.142***	0.049	0.130**	0.123**	0.157***	0.177***	0.187***	0.289***	0.293***
	(0.052)	(0.051)	(0.053)	(0.054)	(0.054)	(0.053)	(0.055)	(0.054)	(0.072)
Export	0.006***	0.007***	0.009***	0.008***	0.006***	0.005***	0.004***	0.005***	0.003**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.272***	0.283***	0.314***	0.335***	0.324***	0.350***	0.366***	0.391***	0.367***
	(0.042)	(0.039)	(0.039)	(0.038)	(0.038)	(0.038)	(0.039)	(0.041)	(0.048)
GDP Growth	-0.009	-0.017**	-0.029***	-0.041***	-0.057***	-0.063***	-0.067***	-0.078***	-0.065***
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.009)
Inflation	0.001	-0.012***	-0.020***	-0.028***	-0.033***	-0.036***	-0.038***	-0.036***	-0.042***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Constant	8.296***	8.748***	9.156***	9.621***	10.022***	10.318***	10.597***	10.846***	11.304***
	(0.089)	(0.097)	(0.101)	(0.099)	(0.090)	(0.084)	(0.083)	(0.083)	(0.112)
Observations	3,911	3,911	3,911	3,911	3,911	3,911	3,911	3,911	3,911

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5d Profitability Results – Full Sample - 2005

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.614***	1.214***	0.980***	0.782***	0.693***	0.530***	0.410***	0.357***	0.225***
	(0.078)	(0.070)	(0.063)	(0.058)	(0.055)	(0.054)	(0.053)	(0.050)	(0.052)
Age of Firm	0.357***	0.321***	0.185	0.045	0.026	-0.088	-0.241**	-0.199**	-0.376***
	(0.057)	(0.086)	(0.127)	(0.122)	(0.125)	(0.111)	(0.096)	(0.098)	(0.059)
Size of Firm	-0.378	-0.166	-0.038	-0.054	-0.050	-0.025	-0.036	0.045	0.011
	(0.297)	(0.142)	(0.066)	(0.064)	(0.062)	(0.063)	(0.068)	(0.066)	(0.044)
Foreign Owned	0.086	0.098	0.322***	0.365***	0.350***	0.373***	0.405***	0.461***	0.617***
	(0.113)	(0.099)	(0.092)	(0.081)	(0.079)	(0.079)	(0.081)	(0.085)	(0.104)
Privately Owned	-0.223**	-0.106	-0.024	-0.006	0.018	0.071	0.101	0.142**	0.089
	(0.104)	(0.069)	(0.066)	(0.062)	(0.061)	(0.061)	(0.062)	(0.062)	(0.073)
Export	-0.000	0.001	0.002*	0.002***	0.002**	0.002**	0.002**	0.002***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.362***	0.323***	0.339***	0.361***	0.352***	0.319***	0.303***	0.254***	0.256***
	(0.055)	(0.043)	(0.041)	(0.039)	(0.037)	(0.037)	(0.037)	(0.037)	(0.042)
GDP Growth	-0.040***	-0.044***	-0.056***	-0.063***	-0.072***	-0.077***	-0.082***	-0.071***	-0.082***
	(0.009)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Inflation	-0.006	-0.019***	-0.029***	-0.035***	-0.037***	-0.041***	-0.049***	-0.049***	-0.051***
	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Sector Dummy	-0.268***	-0.332***	-0.407***	-0.434***	-0.441***	-0.479***	-0.451***	-0.436***	-0.463***
	(0.051)	(0.044)	(0.041)	(0.039)	(0.038)	(0.038)	(0.038)	(0.038)	(0.043)
Constant	7.087***	7.838***	8.365***	8.847***	9.201***	9.608***	10.014***	10.238***	10.851***
	(0.147)	(0.116)	(0.111)	(0.104)	(0.101)	(0.102)	(0.098)	(0.094)	(0.102)
Observations	5,546	5,546	5,546	5,546	5,546	5,546	5,546	5,546	5,546

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5e Profitability Results – Manufacturing Sample – 2005

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.627***	1.211***	0.956***	0.701***	0.523***	0.439***	0.300***	0.136*	0.093
	(0.117)	(0.109)	(0.108)	(0.105)	(0.097)	(0.090)	(0.086)	(0.083)	(0.081)
Age of Firm	0.517	0.336	0.211	0.075	0.083	-0.136	-0.284*	-0.396***	-0.565***
	(0.368)	(0.322)	(0.300)	(0.280)	(0.281)	(0.201)	(0.154)	(0.112)	(0.076)
Size of Firm	0.001	-0.017	0.146	0.073	0.106	0.179	0.254***	0.178***	0.084*
	(0.118)	(0.112)	(0.146)	(0.132)	(0.130)	(0.110)	(0.092)	(0.065)	(0.050)
Foreign Owned	-0.135	0.022	0.216	0.267*	0.236	0.245*	0.355**	0.533***	0.686***
	(0.158)	(0.147)	(0.149)	(0.151)	(0.148)	(0.144)	(0.142)	(0.126)	(0.131)
Privately Owned	-0.358***	-0.202*	-0.122	-0.093	-0.152	-0.164	-0.142	-0.054	-0.004
	(0.119)	(0.112)	(0.122)	(0.127)	(0.123)	(0.116)	(0.107)	(0.096)	(0.102)
Export	-0.003*	-0.002	-0.002**	-0.002	-0.001	-0.002*	-0.001	-0.000	0.000
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.286***	0.310***	0.374***	0.345***	0.348***	0.392***	0.261***	0.237***	0.201***
	(0.071)	(0.063)	(0.060)	(0.058)	(0.057)	(0.056)	(0.058)	(0.056)	(0.058)
GDP Growth	-0.043***	-0.052***	-0.071***	-0.084***	-0.096***	-0.100***	-0.102***	-0.105***	-0.091***
	(0.013)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Inflation	-0.010	-0.027***	-0.039***	-0.049***	-0.053***	-0.061***	-0.067***	-0.069***	-0.067***
	(0.008)	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Constant	7.045***	7.747***	8.266***	8.840***	9.312***	9.681***	10.118***	10.436***	10.715***
	(0.193)	(0.188)	(0.197)	(0.198)	(0.184)	(0.171)	(0.157)	(0.141)	(0.135)
Observations	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5f Profitability Results – Services Sample - 2005

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.583***	1.162***	1.000***	0.831***	0.705***	0.559***	0.487***	0.402***	0.273***
	(0.104)	(0.091)	(0.078)	(0.072)	(0.069)	(0.068)	(0.067)	(0.063)	(0.068)
Age of Firm	0.489***	0.346**	0.201*	0.065	-0.054	-0.167	-0.311***	-0.179	-0.333
	(0.130)	(0.152)	(0.119)	(0.143)	(0.142)	(0.142)	(0.117)	(0.109)	(0.236)
Size of Firm	-0.489***	-0.473	-0.266	-0.104	-0.085	-0.096	-0.099	-0.156***	-0.220***
	(0.087)	(0.314)	(0.218)	(0.106)	(0.079)	(0.068)	(0.066)	(0.055)	(0.045)
Foreign Owned	0.276*	0.186	0.389***	0.459***	0.412***	0.402***	0.380***	0.385***	0.368***
	(0.151)	(0.148)	(0.109)	(0.101)	(0.099)	(0.099)	(0.101)	(0.105)	(0.124)
Privately Owned	-0.099	-0.094	-0.026	0.072	0.103	0.157**	0.139*	0.156**	0.164*
	(0.125)	(0.107)	(0.085)	(0.075)	(0.072)	(0.072)	(0.075)	(0.079)	(0.086)
Export	0.008***	0.008***	0.010***	0.008***	0.006***	0.007***	0.006***	0.005***	0.005***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Loan Receipt	0.391***	0.305***	0.314***	0.346***	0.337***	0.319***	0.338***	0.279***	0.332***
	(0.070)	(0.061)	(0.055)	(0.053)	(0.051)	(0.050)	(0.049)	(0.049)	(0.056)
GDP Growth	-0.031**	-0.038***	-0.044***	-0.045***	-0.054***	-0.065***	-0.062***	-0.057***	-0.068***
	(0.013)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Inflation	-0.003	-0.017***	-0.022***	-0.026***	-0.030***	-0.033***	-0.039***	-0.041***	-0.040***
	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Constant	6.839***	7.788***	8.208***	8.536***	8.953***	9.354***	9.705***	10.049***	10.550***
	(0.182)	(0.154)	(0.135)	(0.124)	(0.121)	(0.121)	(0.119)	(0.116)	(0.127)
Observations	3,190	3,190	3,190	3,190	3,190	3,190	3,190	3,190	3,190

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6a Productivity Results – Full Sample – 2013

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	0.692***	0.635***	0.642***	0.579***	0.544***	0.463***	0.410***	0.360***	0.332***
	(0.057)	(0.047)	(0.043)	(0.040)	(0.037)	(0.036)	(0.036)	(0.041)	(0.054)
Age of Firm	-0.362*	-0.140*	-0.240***	-0.200**	-0.203**	-0.087	-0.020	-0.000	0.081
	(0.202)	(0.075)	(0.079)	(0.086)	(0.094)	(0.114)	(0.095)	(0.101)	(0.116)
Size of Firm	-0.328***	0.073	0.070	0.171***	0.126**	0.084*	0.034	-0.024	0.015
	(0.083)	(0.092)	(0.046)	(0.051)	(0.050)	(0.048)	(0.050)	(0.037)	(0.030)
Foreign Owned	0.378**	0.427***	0.542***	0.586***	0.510***	0.553***	0.566***	0.582***	0.484***
	(0.168)	(0.126)	(0.111)	(0.112)	(0.111)	(0.112)	(0.124)	(0.147)	(0.158)
Privately Owned	0.052	0.074	0.128	0.178*	0.113	0.070	0.015	-0.061	-0.090
	(0.143)	(0.095)	(0.093)	(0.097)	(0.096)	(0.094)	(0.109)	(0.135)	(0.142)
Export	-0.001	-0.002**	-0.002**	-0.001	-0.000	-0.000	0.000	0.001	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.487***	0.478***	0.462***	0.445***	0.450***	0.435***	0.428***	0.408***	0.302***
	(0.049)	(0.039)	(0.035)	(0.033)	(0.032)	(0.031)	(0.030)	(0.032)	(0.041)
GDP Growth	-0.089***	-0.087***	-0.094***	-0.098***	-0.102***	-0.106***	-0.101***	-0.102***	-0.091***
	(0.009)	(0.007)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.007)	(0.009)
Inflation	0.004	-0.002	-0.002	-0.010**	-0.011***	-0.018***	-0.018***	-0.018***	-0.018***
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
Sector Dummy	-0.304***	-0.349***	-0.357***	-0.430***	-0.436***	-0.462***	-0.512***	-0.554***	-0.536***
	(0.049)	(0.038)	(0.033)	(0.032)	(0.030)	(0.029)	(0.030)	(0.033)	(0.042)
Constant	8.536***	9.143***	9.510***	9.892***	10.274***	10.680***	11.061***	11.510***	12.072***
	(0.151)	(0.104)	(0.101)	(0.105)	(0.103)	(0.102)	(0.117)	(0.146)	(0.154)
Observations	10,727	10,727	10,727	10,727	10,727	10,727	10,727	10,727	10,727

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6b Productivity Results – Manufacturing Sample - 2013

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	0.956***	0.865***	0.846***	0.830***	0.764***	0.661***	0.642***	0.596***	0.592***
	(0.080)	(0.068)	(0.064)	(0.062)	(0.062)	(0.060)	(0.061)	(0.069)	(0.100)
Age of Firm	-0.176	-0.081	-0.089	-0.114	-0.076	-0.110	0.097	0.075	0.264*
	(0.268)	(0.121)	(0.116)	(0.116)	(0.129)	(0.146)	(0.145)	(0.127)	(0.145)
Size of Firm	-0.330	0.110***	0.191	0.238***	0.202***	0.157***	0.122***	0.083**	0.059
	(0.213)	(0.028)	(0.169)	(0.058)	(0.056)	(0.050)	(0.045)	(0.041)	(0.052)
Foreign Owned	0.445**	0.394**	0.669***	0.516***	0.442**	0.544***	0.506***	0.424*	0.438
	(0.222)	(0.163)	(0.163)	(0.184)	(0.183)	(0.172)	(0.176)	(0.243)	(0.277)
Privately Owned	0.080	0.181	0.333**	0.271*	0.126	0.087	0.027	-0.115	-0.404*
	(0.193)	(0.129)	(0.140)	(0.164)	(0.164)	(0.154)	(0.160)	(0.228)	(0.226)
Export	-0.003***	-0.003***	-0.002**	-0.002**	-0.002*	-0.002*	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.448***	0.403***	0.400***	0.389***	0.430***	0.397***	0.425***	0.403***	0.356***
	(0.070)	(0.057)	(0.053)	(0.051)	(0.050)	(0.048)	(0.048)	(0.051)	(0.066)
GDP Growth	-0.039***	-0.036***	-0.050***	-0.051***	-0.062***	-0.069***	-0.064***	-0.057***	-0.064***
	(0.014)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.011)	(0.014)
Inflation	-0.001	-0.006	-0.005	-0.009	-0.010	-0.018**	-0.016**	-0.020**	-0.018*
	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.011)
Constant	8.100***	8.598***	8.829***	9.239***	9.683***	10.081***	10.391***	10.872***	11.700***
	(0.199)	(0.136)	(0.147)	(0.171)	(0.174)	(0.165)	(0.174)	(0.246)	(0.238)
Observations	4,186	4,186	4,186	4,186	4,186	4,186	4,186	4,186	4,186

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6c Productivity Results – Services Sample - 2013

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	0.447***	0.459***	0.489***	0.449***	0.389***	0.350***	0.267***	0.242***	0.207***
	(0.075)	(0.063)	(0.058)	(0.052)	(0.049)	(0.047)	(0.047)	(0.050)	(0.063)
Age of Firm	-0.434**	-0.226**	-0.287***	-0.342***	-0.260*	-0.181	-0.063	-0.117	-0.134
	(0.217)	(0.114)	(0.102)	(0.123)	(0.141)	(0.155)	(0.120)	(0.106)	(0.121)
Size of Firm	-0.319***	-0.299***	-0.035	0.144*	0.063	0.022	-0.098	-0.051	-0.095***
	(0.089)	(0.110)	(0.242)	(0.085)	(0.110)	(0.096)	(0.131)	(0.068)	(0.024)
Foreign Owned	0.195	0.388**	0.485***	0.440***	0.562***	0.547***	0.679***	0.723***	0.540***
	(0.230)	(0.161)	(0.142)	(0.141)	(0.146)	(0.151)	(0.154)	(0.175)	(0.197)
Privately Owned	-0.167	-0.107	0.041	0.066	0.111	0.012	0.055	0.003	-0.030
	(0.179)	(0.121)	(0.120)	(0.116)	(0.118)	(0.124)	(0.129)	(0.154)	(0.181)
Export	-0.000	-0.002	-0.001	0.000	0.001	0.001	0.001	0.001	0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Loan Receipt	0.524***	0.520***	0.494***	0.468***	0.500***	0.479***	0.458***	0.392***	0.233***
	(0.066)	(0.052)	(0.048)	(0.044)	(0.043)	(0.041)	(0.041)	(0.042)	(0.051)
GDP Growth	-0.123***	-0.121***	-0.131***	-0.132***	-0.131***	-0.134***	-0.136***	-0.122***	-0.109***
	(0.012)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)	(0.009)	(0.012)
Inflation	0.006	0.003	0.003	-0.008*	-0.011**	-0.016***	-0.019***	-0.022***	-0.024***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.007)
Constant	8.887***	9.437***	9.726***	10.119***	10.383***	10.817***	11.140***	11.544***	12.171***
	(0.190)	(0.136)	(0.133)	(0.126)	(0.128)	(0.135)	(0.140)	(0.165)	(0.194)
Observations	6,542	6,542	6,542	6,542	6,542	6,542	6,542	6,542	6,542

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6d Profitability Results – Full Sample – 2013

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	0.918***	0.811***	0.779***	0.634***	0.553***	0.524***	0.439***	0.383***	0.396***
	(0.103)	(0.092)	(0.081)	(0.075)	(0.073)	(0.076)	(0.083)	(0.099)	(0.114)
Age of Firm	-0.691	-0.618**	-0.535**	-0.491	-0.081	0.011	0.219	0.191	0.057
	(0.505)	(0.253)	(0.265)	(0.363)	(0.308)	(0.327)	(0.304)	(0.217)	(0.211)
Size of Firm	-0.036	0.158	0.112	0.178	0.501	0.650*	0.966***	1.425***	1.629***
	(0.075)	(0.114)	(0.130)	(0.533)	(0.315)	(0.332)	(0.365)	(0.372)	(0.435)
Foreign Owned	1.033***	0.737**	0.677***	0.829***	0.929***	1.000***	0.744**	0.950***	0.655
	(0.382)	(0.288)	(0.262)	(0.257)	(0.271)	(0.306)	(0.322)	(0.311)	(0.456)
Privately Owned	0.331	0.087	0.112	0.134	0.180	0.134	-0.137	-0.014	-0.361
	(0.354)	(0.254)	(0.230)	(0.228)	(0.241)	(0.283)	(0.292)	(0.273)	(0.421)
Export	-0.002	-0.001	-0.000	0.003	0.004**	0.003**	0.004**	0.005**	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Loan Receipt	0.801***	0.686***	0.623***	0.626***	0.574***	0.530***	0.499***	0.452***	0.449***
	(0.086)	(0.076)	(0.069)	(0.067)	(0.064)	(0.065)	(0.071)	(0.082)	(0.098)
GDP Growth	-0.132***	-0.161***	-0.170***	-0.184***	-0.187***	-0.193***	-0.192***	-0.193***	-0.173***
	(0.016)	(0.015)	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)	(0.016)	(0.019)
Inflation	0.089***	0.100***	0.116***	0.129***	0.146***	0.163***	0.182***	0.199***	0.221***
	(0.015)	(0.012)	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)	(0.011)	(0.011)
Sector Dummy	-1.305***	-1.355***	-1.348***	-1.422***	-1.423***	-1.382***	-1.294***	-1.223***	-1.122***
	(0.095)	(0.087)	(0.076)	(0.073)	(0.072)	(0.076)	(0.085)	(0.097)	(0.115)
Constant	7.382***	8.505***	9.050***	9.548***	9.861***	10.286***	10.961***	11.410***	12.480***
	(0.372)	(0.270)	(0.252)	(0.249)	(0.261)	(0.299)	(0.309)	(0.298)	(0.430)
Observations	5,244	5,244	5,244	5,244	5,244	5,244	5,244	5,244	5,244

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6e Profitability Results – Manufacturing Sample – 2013

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	1.227***	1.170***	1.030***	0.987***	0.994***	1.000***	1.029***	0.832***	0.852***
	(0.175)	(0.162)	(0.159)	(0.158)	(0.158)	(0.165)	(0.178)	(0.195)	(0.233)
Age of Firm	-0.376	-0.157	0.165	-0.050	-0.066	-0.259	-0.096	0.296	0.851***
	(0.655)	(0.692)	(0.372)	(0.405)	(0.403)	(0.399)	(0.635)	(0.700)	(0.285)
Size of Firm	-0.032	-0.083*	-0.141**	-0.175*	-0.114	-0.057	0.246	0.808**	0.876*
	(0.112)	(0.047)	(0.062)	(0.103)	(0.171)	(0.147)	(0.857)	(0.380)	(0.495)
Foreign Owned	1.134**	1.631***	1.031	0.681	0.778	0.708	0.698	1.242**	0.273
	(0.535)	(0.588)	(0.658)	(0.621)	(0.618)	(0.578)	(0.569)	(0.605)	(0.726)
Privately Owned	0.589	1.138**	0.678	0.293	-0.000	-0.164	-0.253	0.193	-0.385
	(0.485)	(0.538)	(0.637)	(0.585)	(0.577)	(0.542)	(0.558)	(0.559)	(0.684)
Export	-0.002	0.000	0.002	0.004*	0.005**	0.005**	0.003	0.004	0.008**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)
Loan Receipt	0.770***	0.546***	0.627***	0.649***	0.620***	0.568***	0.579***	0.461***	0.498***
	(0.147)	(0.134)	(0.124)	(0.122)	(0.123)	(0.129)	(0.143)	(0.159)	(0.182)
GDP Growth	-0.123***	-0.107***	-0.121***	-0.109***	-0.120***	-0.110***	-0.126***	-0.123***	-0.064
	(0.031)	(0.026)	(0.024)	(0.024)	(0.024)	(0.026)	(0.028)	(0.036)	(0.039)
Inflation	0.123***	0.139***	0.162***	0.169***	0.165***	0.183***	0.192***	0.208***	0.206***
	(0.025)	(0.025)	(0.024)	(0.021)	(0.022)	(0.021)	(0.023)	(0.021)	(0.019)
Constant	5.609***	5.801***	6.795***	7.543***	8.235***	8.831***	9.409***	9.710***	11.098***
	(0.487)	(0.554)	(0.679)	(0.617)	(0.600)	(0.570)	(0.606)	(0.597)	(0.689)
Observations	1,707	1,707	1,707	1,707	1,707	1,707	1,707	1,707	1,707

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6f Profitability Results – Services Sample – 2013

VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	q.09
EU membership	0.781***	0.692***	0.547***	0.460***	0.381***	0.306***	0.227**	0.088	0.172
	(0.122)	(0.112)	(0.098)	(0.090)	(0.087)	(0.087)	(0.092)	(0.107)	(0.130)
Age of Firm	-0.676	-0.592**	-0.600**	-0.580	-0.115	0.026	0.137	0.267	-0.010
	(0.553)	(0.286)	(0.282)	(0.388)	(0.514)	(0.387)	(0.334)	(0.274)	(0.202)
Size of Firm	0.913***	0.788***	0.988***	0.892***	1.555	2.153***	2.485***	2.518***	3.062**
	(0.174)	(0.181)	(0.264)	(0.259)	(1.012)	(0.578)	(0.488)	(0.508)	(1.398)
Foreign Owned	0.643	0.693**	0.622**	0.791***	0.906***	0.677**	0.738**	1.012***	0.878*
	(0.401)	(0.292)	(0.297)	(0.301)	(0.305)	(0.345)	(0.338)	(0.376)	(0.514)
Privately Owned	-0.071	0.043	-0.000	0.146	0.194	0.019	0.026	0.080	-0.226
	(0.357)	(0.247)	(0.252)	(0.261)	(0.276)	(0.314)	(0.304)	(0.322)	(0.459)
Export	-0.007**	-0.005*	-0.003	0.001	0.002	0.002	0.001	0.002	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)
Loan Receipt	0.815***	0.707***	0.610***	0.617***	0.552***	0.503***	0.502***	0.445***	0.508***
	(0.104)	(0.090)	(0.082)	(0.078)	(0.078)	(0.078)	(0.083)	(0.093)	(0.113)
GDP Growth	-0.166***	-0.176***	-0.202***	-0.213***	-0.216***	-0.223***	-0.235***	-0.233***	-0.206***
	(0.021)	(0.019)	(0.018)	(0.017)	(0.016)	(0.016)	(0.016)	(0.018)	(0.021)
Inflation	0.083***	0.100***	0.102***	0.119***	0.140***	0.148***	0.184***	0.199***	0.233***
	(0.018)	(0.014)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.013)	(0.013)
Constant	7.952***	8.621***	9.417***	9.717***	10.020***	10.612***	10.986***	11.514***	12.387***
	(0.380)	(0.269)	(0.275)	(0.286)	(0.306)	(0.336)	(0.327)	(0.348)	(0.485)
Observations	3,537	3,537	3,537	3,537	3,537	3,537	3,537	3,537	3,537

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 7

Figure A. Checking the overlap assumption (common region) for the full sample.

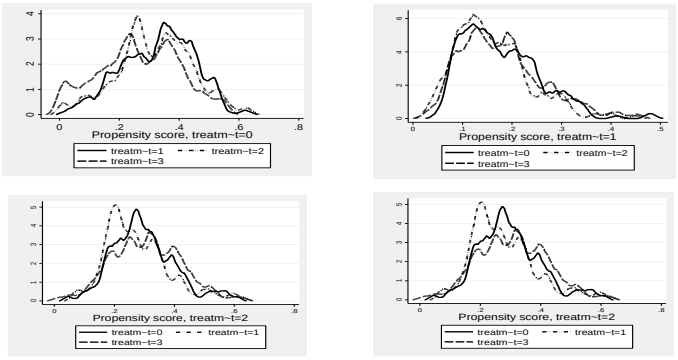


Figure B. Checking the overlap assumption (common region) for the subsample of firms in the service sector.

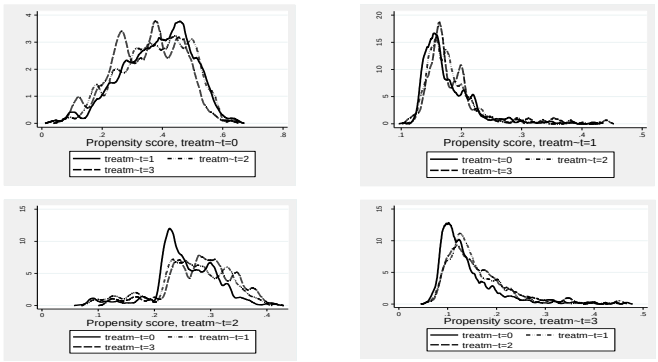
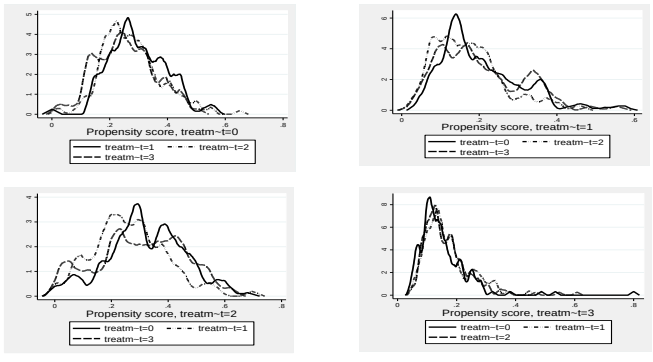


Figure C. Checking the overlap assumption (common region) in the subsample of firms from the manufacturing sector.



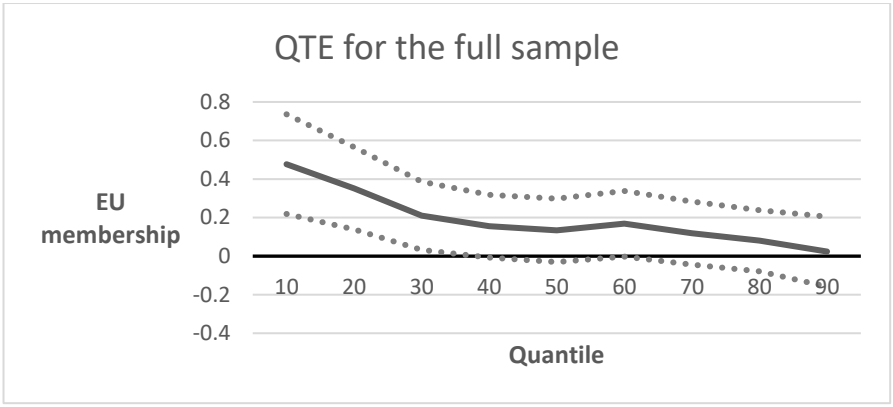
Appendix 8

Table 1. The estimated ATTs effects using the IPWRA estimator with two treatments: EU membership and access to loans.

Outcome variable	Full sample			Service sector			Manufacturing sector		
	T= 1 vs T =0	T=2 vs T=0	T=3 vs T=0	T= 1 vs T =0	T=2 vs T=0	T=3 vs T=0	T= 1 vs T =0	T=2 vs T=0	T=3 vs T=0
	1.	2.	3.	4.	5.	6.	7.	8.	9.
Output per worker	0.616*** (0.095)	0.386*** (0.104)	0.735*** (0.134)	0.704*** (0.100)	0.440*** (0.092)	0.833*** (0.107)	0.597*** (0.121)	0.360*** (0.125)	0.560*** (0.141)
Output per worker (in %)	0.061*** (0.012)	0.039*** (0.011)	0.074*** (0.014)	0.068*** (0.010)	0.043** (0.009)	0.081*** (0.019)	0.059*** (0.012)	0.036*** (0.120)	0.056*** (0.015)

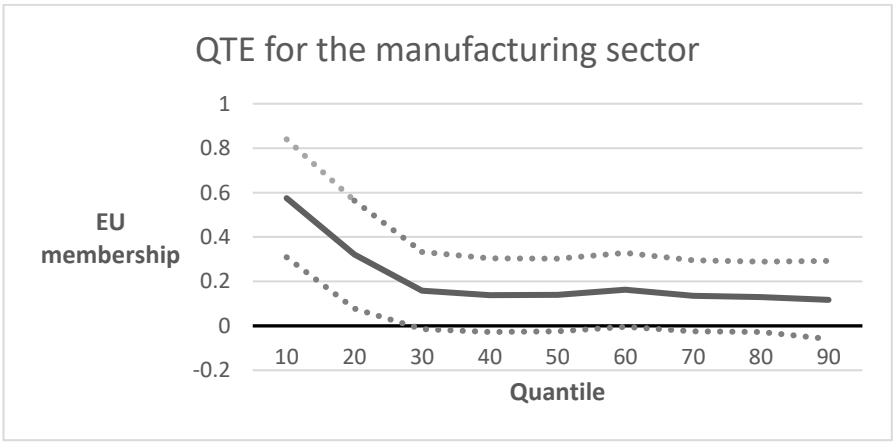
Appendix 9

Figure 9a. Results from the QTE model for the full sample with EU membership as a treatment variable.



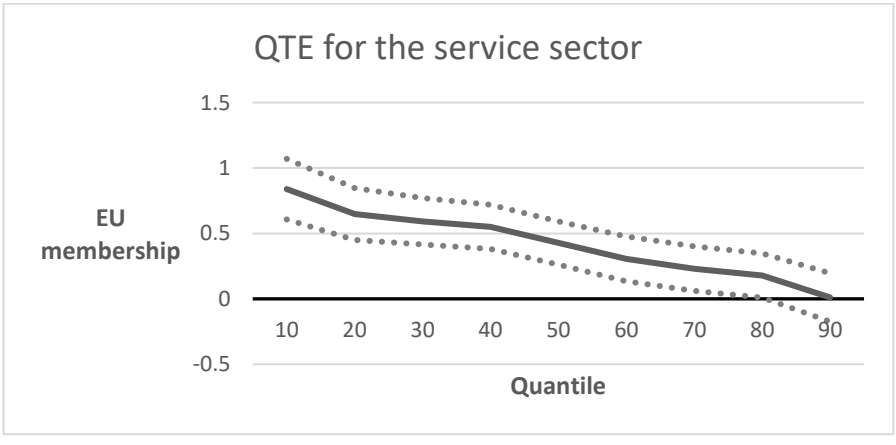
Note: Dotted lines show upper and lower limits of the 95% confidence interval.

Figure 9b. Results from the QTE model for the manufacturing sector with EU membership as a treatment variable.



Note: Dotted lines show upper and lower limits of the 95% confidence interval.

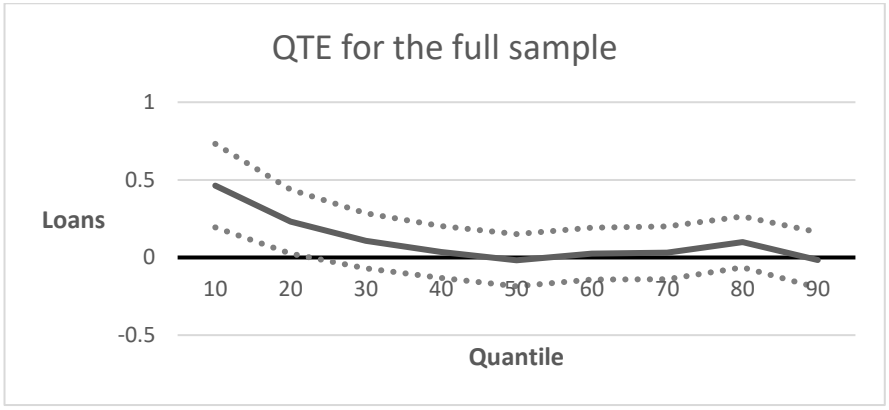
Figure 9c. Results from the QTE model for the service sector with EU membership as a treatment variable.



Note: Dotted lines show upper and lower limits of the 95% confidence interval.

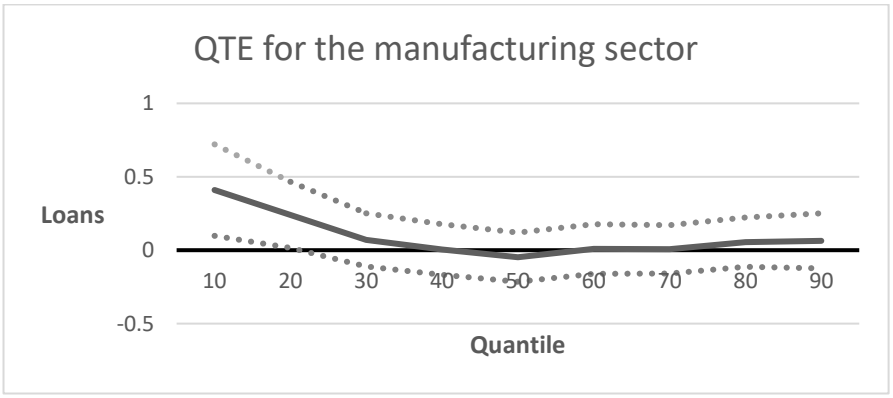
Appendix 10

Figure A. Results from the QTE model for the full sample with access to loans as a treatment variable.



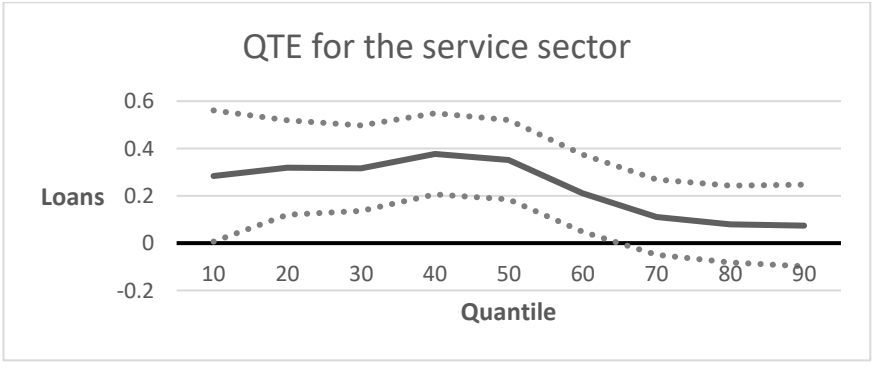
Note: Dotted lines show upper and lower limits of the 95% confidence interval.

Figure B. Results from the QTE model for the manufacturing sector with access to loans as a treatment variable.



Note: Dotted lines show upper and lower limits of the 95% confidence interval.

Figure C. Results from the QTE model for the service sector with access to loans as a treatment variable.



Note: Dotted lines show upper and lower limits of the 95% confidence interval.

Appendix 11a. Results from the QTE model Full Sample with EU membership as the treatment and output per worker as the outcome variable

VARIABLES	(1) q.01	(2) q.02	(3) q.03	(4) q.04	(5) q.05	(6) q.06	(7) q.07	(8) q.08	(9) 9.09
EU membership	0.477***	0.352***	0.210**	0.155*	0.134	0.168*	0.119	0.080	0.024
	(0.135)	(0.110)	(0.090)	(0.083)	(0.084)	(0.086)	(0.084)	(0.082)	(0.098)
Capital (assets)	0.002	0.002	0.002	0.001	0.001	0.002*	0.002	0.001	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Capital	0.000	-0.000	-0.000*	-0.001***	-0.001**	-0.000	-0.000	-0.000*	-0.000
(replacement)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Capital (rental)	0.070***	0.062**	0.052**	0.042**	0.029	0.011	0.006	-0.002	0.020
	(0.010)	(0.025)	(0.022)	(0.021)	(0.019)	(0.018)	(0.016)	(0.015)	(0.047)
Exports	0.493*	0.183	0.204	0.192	0.198	0.104	0.106	0.131	-0.068
	(0.292)	(0.282)	(0.256)	(0.245)	(0.273)	(0.278)	(0.287)	(0.307)	(0.365)
Skilled workers	-0.348	-0.511**	-0.477***	-0.302*	-0.341*	-0.362*	-0.437**	-0.519***	-0.780***
	(0.215)	(0.204)	(0.183)	(0.177)	(0.184)	(0.186)	(0.188)	(0.191)	(0.234)
Cost per worker	0.013***	0.015***	0.019***	0.021***	0.019***	0.018***	0.016***	0.014***	0.010***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Foreign-owned	-0.001	0.001	0.001	0.001	0.002	0.001	0.003	0.002	0.001
	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Firm age	-0.004	-0.005	0.000	0.000	0.000	-0.002	-0.002	-0.001	-0.006**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
Bureaucracy	0.213**	0.105	0.026	0.028	0.064	0.089	0.103	0.082	0.172*
	(0.103)	(0.083)	(0.071)	(0.071)	(0.075)	(0.078)	(0.079)	(0.080)	(0.099)
Firm size	0.115	0.146*	0.095	0.082	0.062	0.065	0.059	0.081	0.125*
	(0.096)	(0.084)	(0.063)	(0.058)	(0.059)	(0.060)	(0.058)	(0.061)	(0.071)
Competition	-0.037	0.014	0.016	0.030	-0.078	-0.112	-0.095	-0.098	-0.099
	(0.129)	(0.111)	(0.090)	(0.085)	(0.085)	(0.085)	(0.085)	(0.085)	(0.095)
Low-tech	-0.339**	-0.407***	-0.361***	-0.381***	-0.297***	-0.273**	-0.296***	-0.283**	-0.219*
	(0.159)	(0.138)	(0.124)	(0.113)	(0.112)	(0.114)	(0.111)	(0.111)	(0.132)
Mid-tech	-0.291	-0.287*	-0.085	-0.141	-0.182	-0.237**	-0.206*	-0.216*	-0.265**
	(0.185)	(0.153)	(0.121)	(0.111)	(0.113)	(0.113)	(0.111)	(0.113)	(0.129)
Services	-0.286	-0.471	-0.237	-0.167	-0.014	-0.127	0.320	0.374	0.883*
	(0.373)	(0.320)	(0.291)	(0.324)	(0.346)	(0.321)	(0.425)	(0.403)	(0.523)
Constant	9.022***	9.603***	9.716***	9.836***	10.133***	10.345***	10.607***	10.894***	11.477***
	(0.265)	(0.244)	(0.203)	(0.186)	(0.191)	(0.191)	(0.187)	(0.185)	(0.213)
Observations	550	550	550	550	550	550	550	550	550

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 11b. Results from the QTE model Manufacturing Sample with EU Membership as the treatment and output per worker as the outcome variable

VARIABLES	(1) q.01	(2) q.02	(3) q.03	(4) q.04	(5) q.05	(6) q.06	(7) q.07	(8) q.08	(9) 9.09
EU membership	0.575***	0.321***	0.159*	0.138	0.139*	0.163*	0.135*	0.130	0.117
	(0.127)	(0.124)	(0.089)	(0.084)	(0.083)	(0.085)	(0.081)	(0.081)	(0.092)
Capital (assets)	0.002**	0.002	0.001	0.001	0.001	0.002	0.002*	0.001*	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Capital	0.000	-0.000	-0.000**	-0.001***	-0.000	-0.000	-0.000	-0.000***	0.000
(replacement)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
Capital (rental)	0.073***	0.061***	0.053**	0.045**	0.035*	0.014	0.007	0.006	0.016
	(0.025)	(0.018)	(0.022)	(0.021)	(0.019)	(0.019)	(0.019)	(0.015)	(0.038)
Exports	0.206	0.192	0.321	0.220	0.171	0.086	0.040	0.051	-0.022
	(0.311)	(0.298)	(0.268)	(0.255)	(0.259)	(0.271)	(0.259)	(0.289)	(0.344)
Skilled workers	-0.500**	-0.479**	-0.436**	-0.307*	-0.261	-0.329*	-0.404**	-0.364**	-0.711***
	(0.234)	(0.217)	(0.189)	(0.182)	(0.182)	(0.184)	(0.180)	(0.178)	(0.206)
Cost per worker	0.012***	0.016***	0.019***	0.021***	0.020***	0.018***	0.017***	0.016***	0.011***
	(0.001)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Foreign-owned	-0.001	0.003	0.004	0.002	0.002	0.001	0.002	0.001	0.001
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Firm age	-0.011*	-0.004	0.000	0.000	-0.001	-0.002	-0.002	-0.002	-0.007***
	(0.006)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Bureaucracy	0.213**	0.091	0.013	0.026	0.098	0.094	0.087	0.158*	0.246**
	(0.098)	(0.088)	(0.070)	(0.074)	(0.078)	(0.085)	(0.083)	(0.084)	(0.105)
Firm size	0.212**	0.125	0.117*	0.080	0.096*	0.077	0.085	0.099*	0.150**
	(0.089)	(0.089)	(0.060)	(0.058)	(0.058)	(0.062)	(0.058)	(0.060)	(0.065)
Competition	-0.136	0.021	0.039	0.043	-0.004	-0.089	-0.076	-0.095	-0.116
	(0.124)	(0.116)	(0.092)	(0.087)	(0.086)	(0.086)	(0.085)	(0.086)	(0.092)
Low-tech	-0.176	-0.361**	-0.315**	-0.398***	-0.295**	-0.315***	-0.323***	-0.378***	-0.260**
	(0.162)	(0.165)	(0.136)	(0.123)	(0.121)	(0.120)	(0.115)	(0.114)	(0.132)
Mid-tech	-0.184	-0.250	-0.051	-0.153	-0.147	-0.255**	-0.264**	-0.248**	-0.287**
	(0.190)	(0.166)	(0.133)	(0.120)	(0.122)	(0.120)	(0.114)	(0.117)	(0.122)
Services	1.025	0.680***	0.588	0.326	0.244	-0.124	-0.214	-0.257	-0.527
	(0.971)	(0.250)	(0.562)	(0.364)	(0.454)	(0.587)	(0.634)	(0.209)	(0.922)
Constant	9.027***	9.581***	9.645***	9.845***	9.884***	10.278***	10.487***	10.642***	11.296***
	(0.287)	(0.268)	(0.211)	(0.195)	(0.195)	(0.207)	(0.196)	(0.189)	(0.233)
Observations	450	450	450	450	450	450	450	450	450

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 11c. Results from the QTE model Services Sample with EU Membership as the treatment and output per worker as the outcome variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	9.09
EU membership	0.839***	0.647***	0.593***	0.550***	0.427***	0.305***	0.231***	0.178**	0.011
	(0.119)	(0.101)	(0.090)	(0.086)	(0.084)	(0.087)	(0.086)	(0.085)	(0.093)
export	0.401	-0.121	-0.292	0.196	0.570	0.436	0.431	0.367	0.390
	(0.408)	(0.378)	(0.408)	(0.603)	(0.489)	(0.440)	(0.409)	(0.385)	(0.370)
Cost per worker	0.015***	0.016***	0.017***	0.015***	0.012***	0.018**	0.022***	0.022***	0.024***
	(0.002)	(0.005)	(0.005)	(0.004)	(0.003)	(0.007)	(0.007)	(0.006)	(0.005)
Foreign-owned	0.004	0.008***	0.007***	0.006***	0.006***	0.005***	0.004***	0.004**	0.007**
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Firm age	0.015***	0.015***	0.017***	0.013***	0.012***	0.011***	0.010**	0.010**	0.009
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)
Bureaucracy	0.158	0.143*	0.097	0.122	0.072	0.084	0.113	0.126*	0.089
	(0.105)	(0.080)	(0.081)	(0.078)	(0.076)	(0.074)	(0.073)	(0.069)	(0.079)
Firm size	0.333***	0.291***	0.254***	0.236***	0.208***	0.168***	0.151***	0.118**	0.099*
	(0.089)	(0.069)	(0.063)	(0.060)	(0.056)	(0.054)	(0.051)	(0.051)	(0.059)
Competition	-0.047	-0.139	-0.199**	-0.191**	-0.202**	-0.237***	-0.217***	-0.233***	-0.259***
	(0.119)	(0.097)	(0.091)	(0.088)	(0.086)	(0.083)	(0.081)	(0.081)	(0.090)
Constant	7.920***	8.673***	9.101***	9.532***	9.999***	10.364***	10.662***	11.033***	11.562***
	(0.155)	(0.131)	(0.131)	(0.132)	(0.130)	(0.131)	(0.133)	(0.141)	(0.174)
Observations	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 12a. Results from the QTE model Full Sample with Loans as the treatment and output per worker as the outcome variable

VARIABLES	(1) q.01	(2) q.02	(3) q.03	(4) q.04	(5) q.05	(6) q.06	(7) q.07	(8) q.08	(9) 9.09
EU membership	0.463***	0.232**	0.107	0.036	-0.018	0.025	0.031	0.100	-0.016
	(0.139)	(0.105)	(0.092)	(0.085)	(0.086)	(0.085)	(0.087)	(0.084)	(0.095)
Capital (assets)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002*
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Capital (replacement)	0.000	-0.000	-0.000	-0.001***	-0.000	0.000	-0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Capital (rental)	0.076***	0.068**	0.056**	0.042*	0.023	0.020	0.007	-0.002	0.019
	(0.012)	(0.027)	(0.025)	(0.022)	(0.021)	(0.019)	(0.017)	(0.015)	(0.044)
Exports	0.418	0.088	0.318	0.229	0.176	0.109	0.086	0.191	-0.045
	(0.355)	(0.276)	(0.249)	(0.243)	(0.259)	(0.264)	(0.279)	(0.283)	(0.341)
Skilled workers	-0.602***	-0.567***	-0.498***	-0.371**	-0.378**	-0.367**	-0.456**	-0.407**	-0.803***
	(0.219)	(0.207)	(0.188)	(0.177)	(0.183)	(0.185)	(0.188)	(0.184)	(0.232)
Cost per worker	0.014***	0.019***	0.019***	0.020***	0.019***	0.018***	0.016***	0.013***	0.010***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Foreign-owned	-0.001	-0.004	0.000	0.002	0.002	0.002	0.002	0.003	0.001
	(0.003)	(0.005)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Firm age	-0.007	-0.002	-0.001	-0.000	-0.000	0.000	-0.002	-0.002	-0.006**
	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Bureaucracy	0.175**	0.078	0.020	0.037	0.101	0.047	0.120	0.080	0.157
	(0.086)	(0.078)	(0.072)	(0.072)	(0.080)	(0.078)	(0.082)	(0.079)	(0.100)
Firm size	0.200**	0.181**	0.051	0.067	0.056	0.071	0.054	0.046	0.120*
	(0.090)	(0.075)	(0.066)	(0.059)	(0.063)	(0.062)	(0.061)	(0.059)	(0.067)
Competition	-0.019	0.002	0.032	-0.025	-0.120	-0.114	-0.115	-0.143*	-0.096
	(0.126)	(0.102)	(0.091)	(0.085)	(0.085)	(0.085)	(0.088)	(0.086)	(0.093)
Low-tech	-0.376**	-0.352**	-0.433***	-0.368***	-0.332***	-0.298***	-0.308***	-0.335***	-0.221*
	(0.157)	(0.143)	(0.125)	(0.114)	(0.114)	(0.113)	(0.114)	(0.112)	(0.132)
Mid-tech	-0.245	-0.107	-0.126	-0.138	-0.216*	-0.199*	-0.210*	-0.215*	-0.261**
	(0.186)	(0.149)	(0.123)	(0.114)	(0.114)	(0.113)	(0.115)	(0.117)	(0.129)
Services	-0.167	-0.263	-0.402	-0.310	-0.137	-0.020	0.395	0.393	0.837*
	(0.231)	(0.275)	(0.310)	(0.326)	(0.358)	(0.366)	(0.442)	(0.402)	(0.506)
Constant	9.018***	9.367***	9.855***	9.971***	10.234***	10.342***	10.699***	10.908***	11.519***
	(0.260)	(0.234)	(0.212)	(0.189)	(0.195)	(0.190)	(0.187)	(0.176)	(0.221)
Observations	550	550	550	550	550	550	550	550	550

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 12b. Results from the QTE model Manufacturing Sample with Loans as the treatment and output per worker as the outcome variable

VARIABLES	(1) q.01	(2) q.02	(3) q.03	(4) q.04	(5) q.05	(6) q.06	(7) q.07	(8) q.08	(9) 9.09
EU membership	0.410**	0.241**	0.071	0.004	-0.048	0.008	0.006	0.054	0.063
	(0.159)	(0.115)	(0.092)	(0.088)	(0.085)	(0.086)	(0.084)	(0.086)	(0.096)
Capital (assets)	0.000	0.000	0.000	0.000	0.000	0.000	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Capital (replacement)	0.000	-0.000	-0.000**	-0.000*	0.000	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Capital (rental)	0.000***	0.000**	0.000***	0.000**	0.000*	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exports	0.205	0.098	0.406	0.353	0.196	0.077	0.014	0.225	0.037
	(0.339)	(0.284)	(0.262)	(0.272)	(0.251)	(0.255)	(0.245)	(0.274)	(0.278)
Skilled workers	-0.632***	-0.272	-0.532***	-0.276	-0.299*	-0.302*	-0.357**	-0.434**	-0.717***
	(0.237)	(0.225)	(0.183)	(0.183)	(0.180)	(0.184)	(0.179)	(0.179)	(0.217)
Cost per worker	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Foreign-owned	-0.001	0.001	0.005*	0.003	0.002	0.001	0.001	0.002	0.001
	(0.006)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Firm age	-0.009	-0.001	-0.000	-0.000	-0.000	0.000	-0.001	-0.001	-0.005**
	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Bureaucracy	0.115	0.044	-0.016	0.028	0.095	0.061	0.103	0.141	0.210*
	(0.090)	(0.076)	(0.069)	(0.075)	(0.086)	(0.084)	(0.084)	(0.087)	(0.108)
Firm size	0.245***	0.091	0.055	0.094	0.086	0.077	0.090	0.052	0.100
	(0.088)	(0.079)	(0.062)	(0.059)	(0.063)	(0.063)	(0.060)	(0.059)	(0.069)
Competition	-0.033	-0.063	0.084	0.008	-0.066	-0.124	-0.087	-0.097	-0.166*
	(0.129)	(0.109)	(0.090)	(0.087)	(0.086)	(0.086)	(0.085)	(0.086)	(0.097)
Low-tech	-0.293*	-0.169	-0.357***	-0.369***	-0.399***	-0.314***	-0.362***	-0.382***	-0.269*
	(0.162)	(0.161)	(0.129)	(0.124)	(0.120)	(0.122)	(0.119)	(0.115)	(0.142)
Mid-tech	-0.231	0.004	-0.080	-0.144	-0.243**	-0.215*	-0.267**	-0.286**	-0.315**
	(0.198)	(0.162)	(0.129)	(0.126)	(0.123)	(0.124)	(0.121)	(0.116)	(0.129)
Services	1.210	0.786***	0.662**	0.415	0.166	-0.022	-0.125	-0.378	-0.490
	(0.957)	(0.252)	(0.280)	(0.374)	(0.508)	(0.423)	(0.629)	(0.753)	(0.876)
Constant	9.038***	9.265***	9.804***	9.863***	10.101***	10.269***	10.506***	10.773***	11.433***
	(0.258)	(0.257)	(0.212)	(0.200)	(0.205)	(0.205)	(0.195)	(0.185)	(0.231)
Observations	450	450	450	450	450	450	450	450	450

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 12c. Results from the QTE model Services Sample with Loans as the treatment and output per worker as the outcome variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	q.01	q.02	q.03	q.04	q.05	q.06	q.07	q.08	9.09
EU membership	0.284**	0.319***	0.316***	0.377***	0.352***	0.211**	0.110	0.080	0.074
	(0.141)	(0.101)	(0.092)	(0.087)	(0.086)	(0.083)	(0.081)	(0.083)	(0.087)
export	0.285	-0.164	-0.274	0.079	0.133	0.442	0.202	0.220	0.425
	(0.461)	(0.445)	(0.457)	(0.511)	(0.489)	(0.435)	(0.409)	(0.391)	(0.376)
Cost per worker	0.016***	0.019***	0.018***	0.018***	0.020***	0.023***	0.023***	0.027***	0.024***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Foreign-owned	0.004	0.009***	0.009***	0.008***	0.006***	0.005***	0.004***	0.004**	0.008**
	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Firm age	0.013**	0.015***	0.015***	0.015***	0.013***	0.010**	0.011**	0.011**	0.005
	(0.006)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)
Bureaucracy	0.083	0.109	0.170**	0.133*	0.096	0.102	0.121*	0.131*	0.104
	(0.137)	(0.089)	(0.080)	(0.076)	(0.074)	(0.072)	(0.071)	(0.071)	(0.081)
Firm size	0.396***	0.291***	0.283***	0.219***	0.190***	0.143***	0.179***	0.121**	0.106*
	(0.105)	(0.072)	(0.064)	(0.059)	(0.056)	(0.054)	(0.052)	(0.055)	(0.060)
Competition	-0.113	-0.156	-0.255***	-0.164*	-0.210**	-0.205**	-0.250***	-0.284***	-0.295***
	(0.131)	(0.102)	(0.094)	(0.088)	(0.085)	(0.082)	(0.079)	(0.081)	(0.087)
Constant	8.022***	8.745***	9.130***	9.521***	9.923***	10.379***	10.627***	11.045***	11.570***
	(0.171)	(0.141)	(0.134)	(0.133)	(0.135)	(0.136)	(0.136)	(0.145)	(0.170)
Observations	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1